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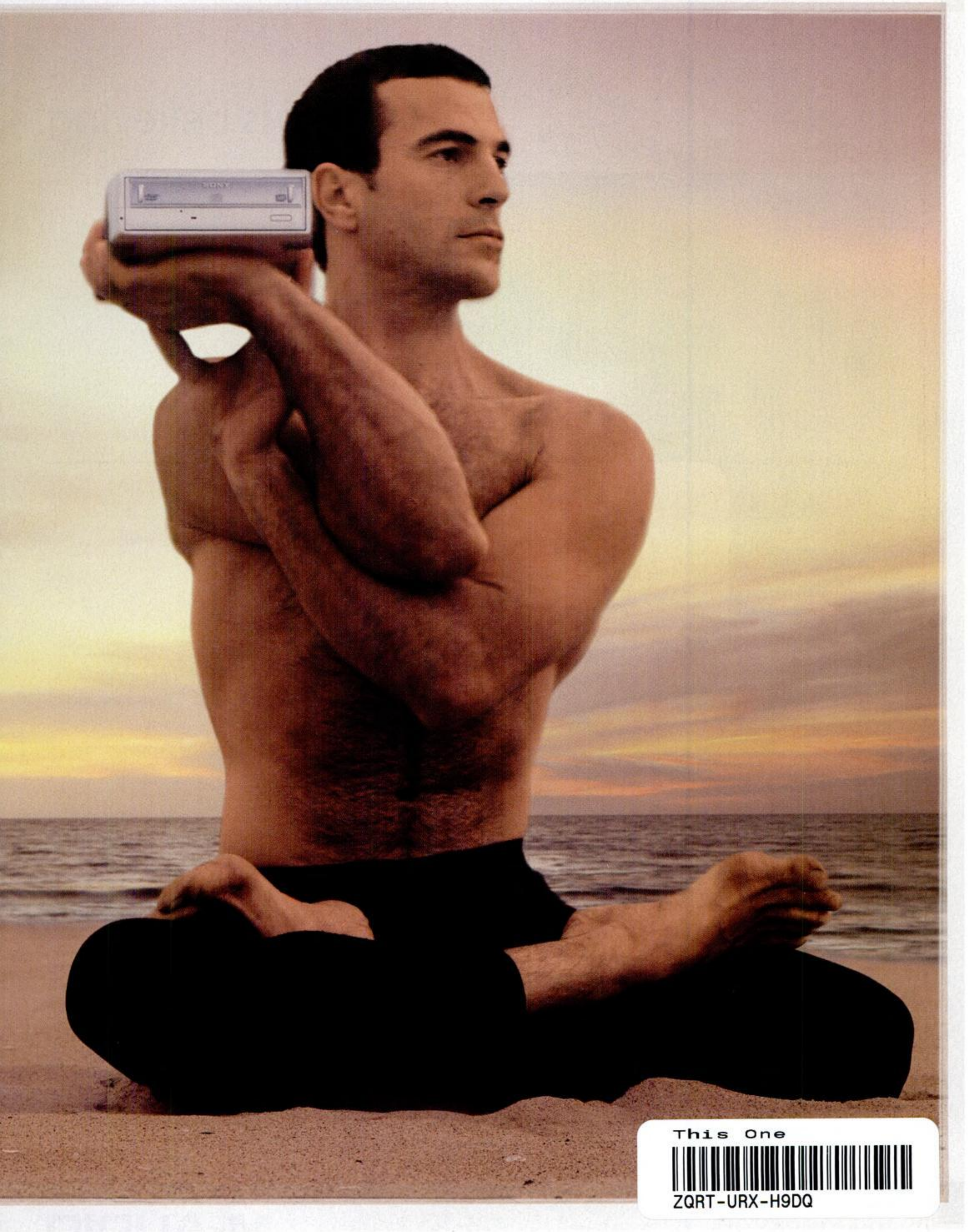

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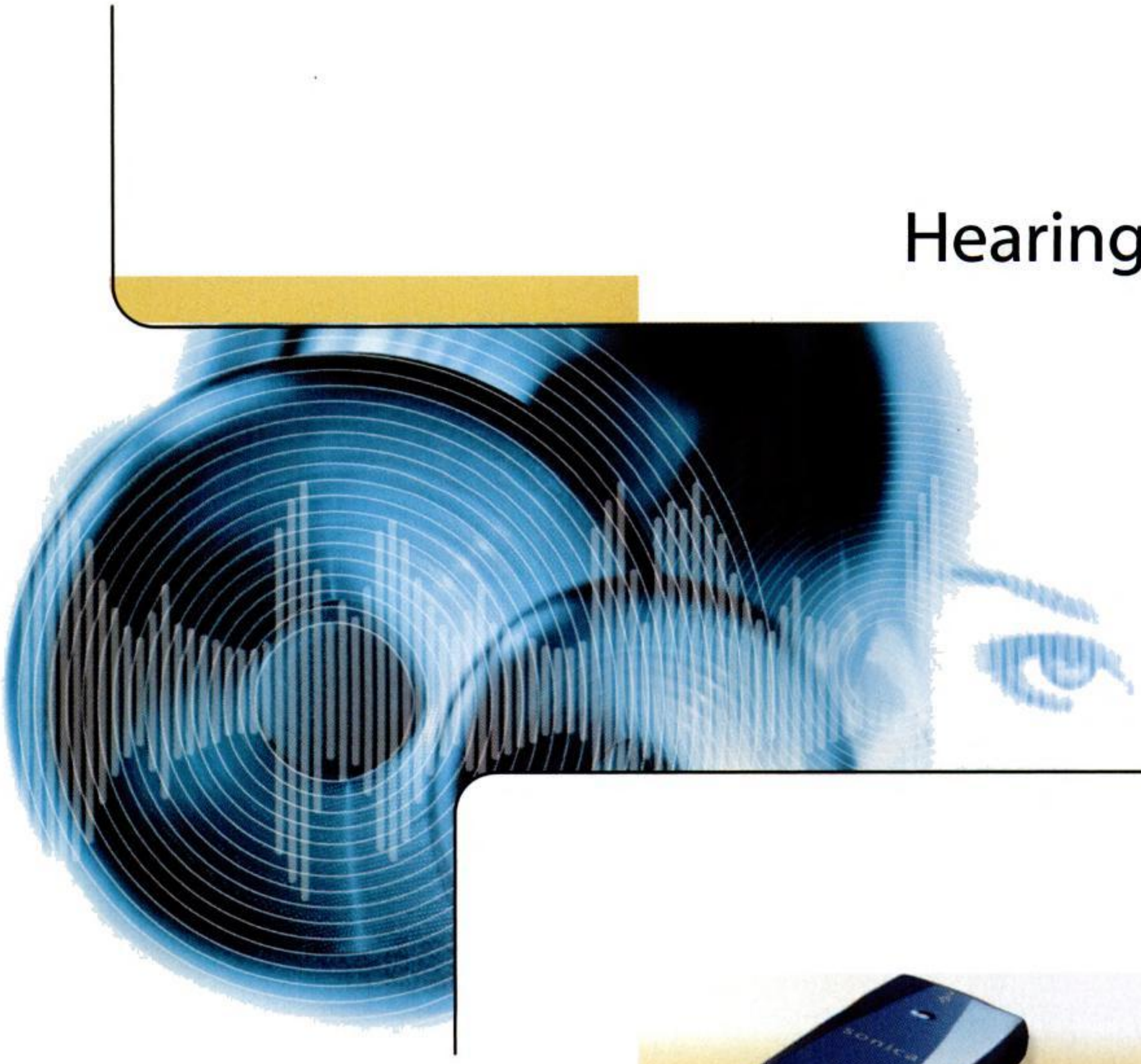

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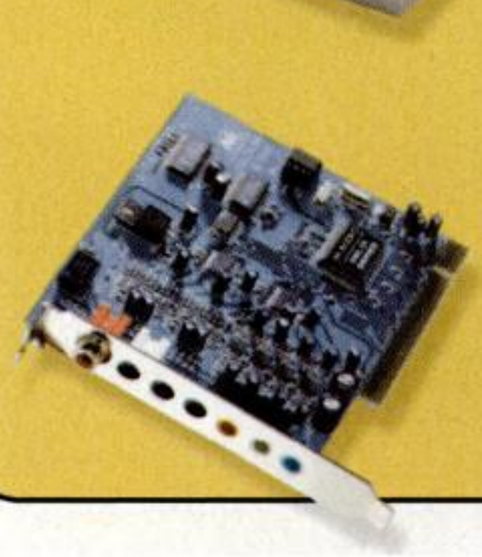

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Release Notes

8 Simple Rules for E-mailing Our Videocard-Loving Cover Model

The last time we ran a photo of Rachel G. on the cover (February 2001), she was dressed in a campy nurse get-up, and the readers went wild. Scary wild. Like, "I'm writing to request her e-mail address" wild. This year, lest there be any confusion about Rachel's personal policies, we're providing some "rules of decorum" right from the giddy-up:

(1) Our cover model is an attractive, intelligent woman with her own rich social life. She has no trouble finding dates. So, no, you may not have her e-mail address.

(2) Our cover model was paid to pose for the pictures in the magazine—nothing more, nothing less. She was not paid to correspond with readers. So, no, you may not have her e-mail address.

(3) Sometimes people just want to finish a hard work day, and go home without having to worry about the vagaries of their jobs. So, no, you may not have her e-mail address.

(4) Why would anyone want her e-mail address in the first place? Seriously, what would one hope to accomplish by sending Rachel letters? So, no, you may not have her e-mail address.

(5) You can't trick us. Requesting her e-mail address because you think she's an old high-school friend won't fly. And if you want to talk to her about "modeling opportunities," then you should ask for her agent's e-mail address. So, no, you may not have her e-mail address.

(6) Do you really think she's interested in dating you? I mean, sure, every once in a while, poor schlubs like us score one of those rare Paulina Porizkova/Ric Ocasek arrangements, but the natural laws of the universe say your chances are slim to nil. So, no, you may not have her e-mail address.

(7) You just want to ask her what she thinks of the new DDR-II spec? Nice try. Very creative. But, no, you may not have her e-mail address.

(8) And you can't have any more photos of her either. This magazine contains all you're getting. So please quit asking.

And, no, you may not have her e-mail address.

—JON PHILLIPS

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Panasonic and Sony pit their noise-cancelling headphones against one another in a battle that may leave your ears ringing.

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63 Ask the Doctor
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67 How To...
Rid Windows XP of its blubber and bloat to create an OS that's in fighting shape.

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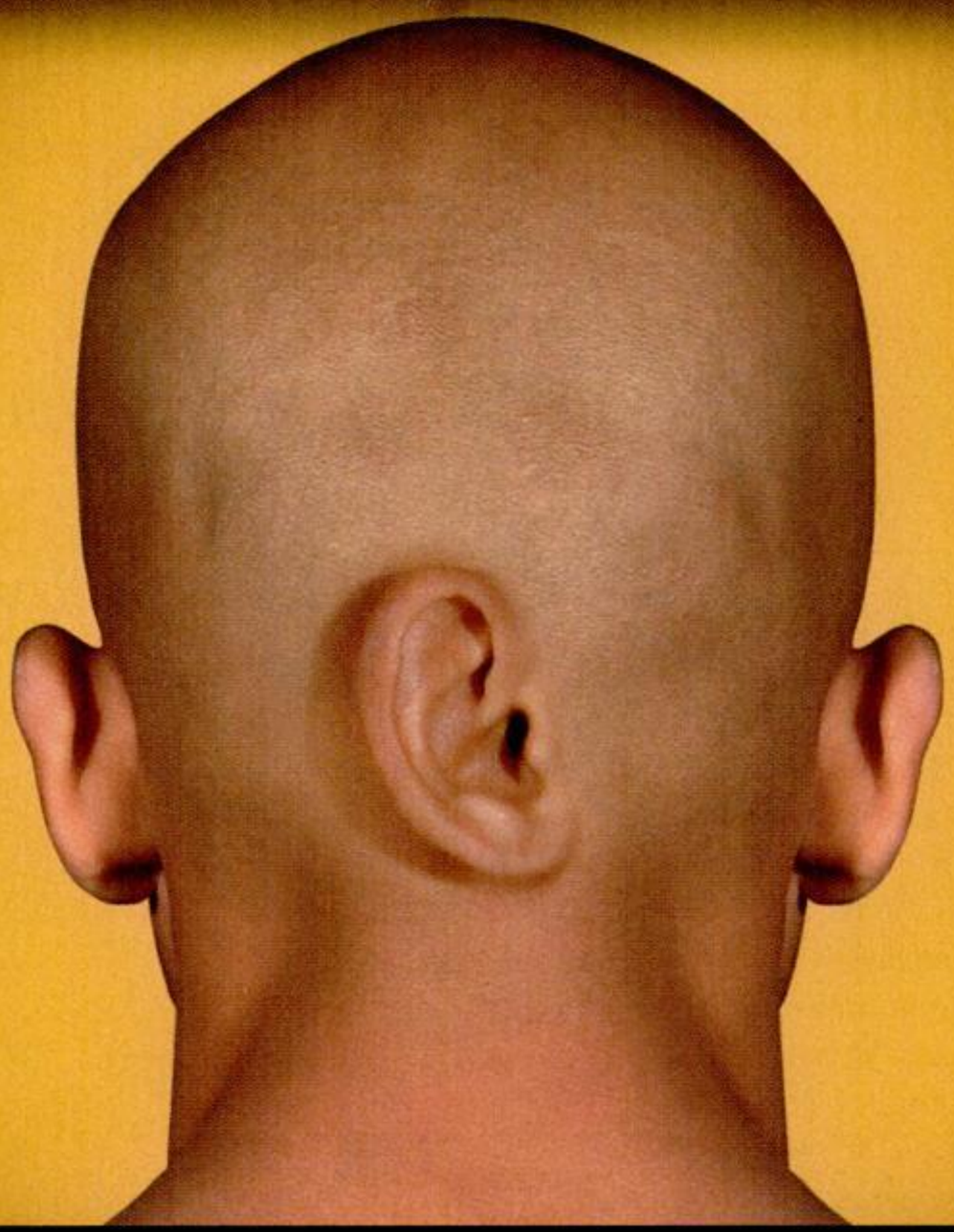

6.1

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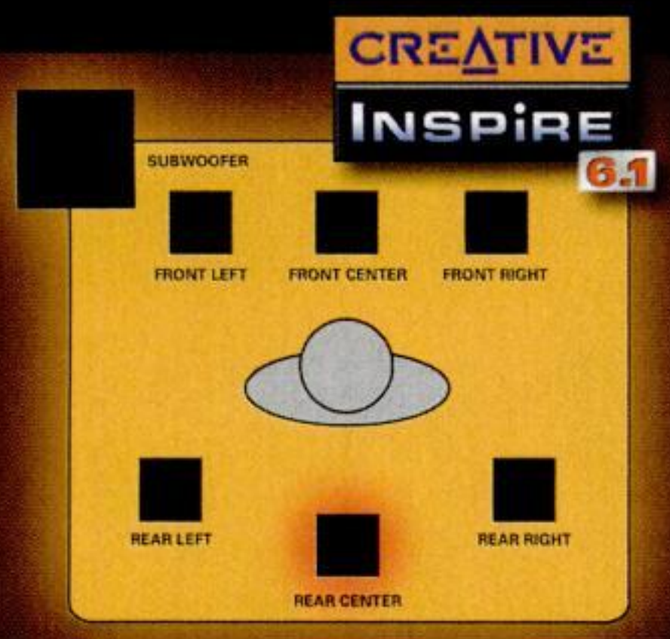

6.1 Surround

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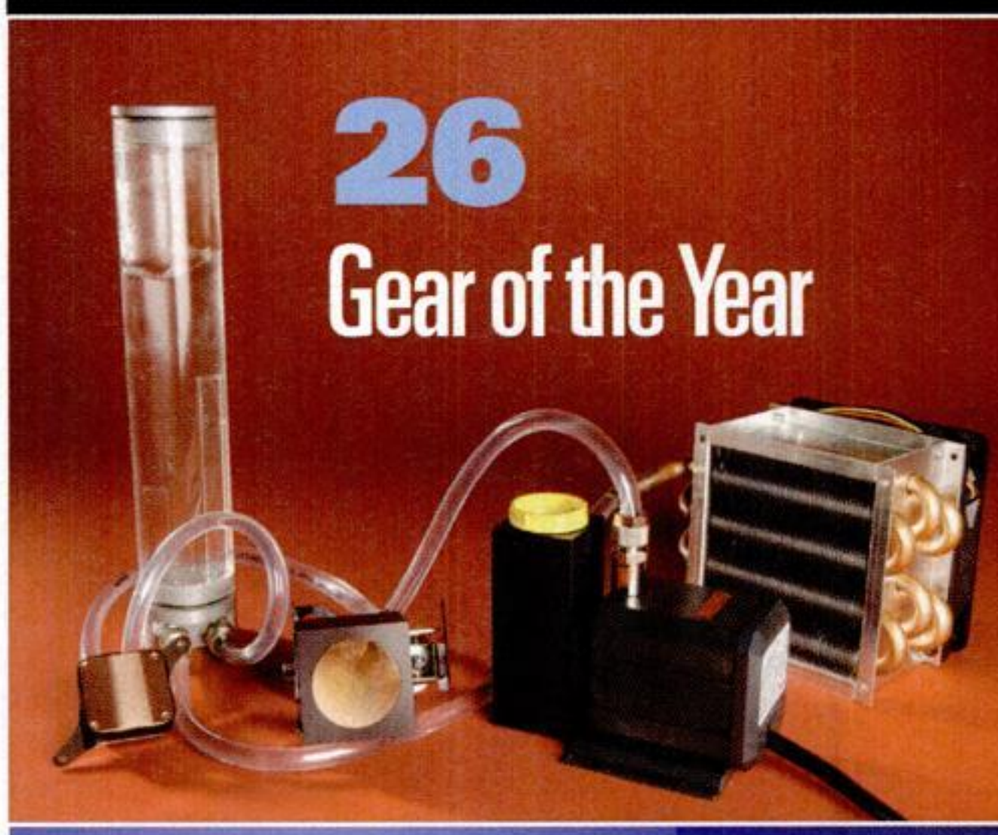
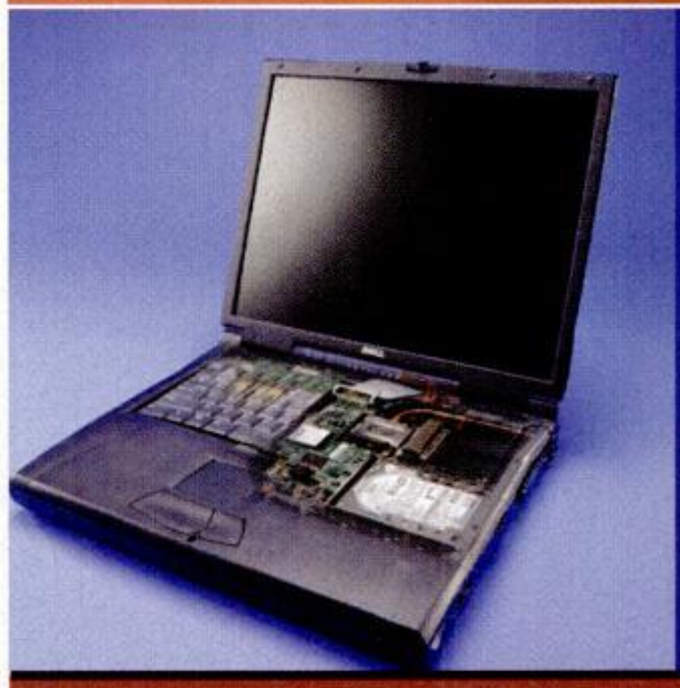


26 Gear of the Year

After 12 months of hardcore Lab testing, we're ready to declare the best hardware components of 2003. Legends are made! Dreams are shattered! We've got 25 awards and quite a few surprises.

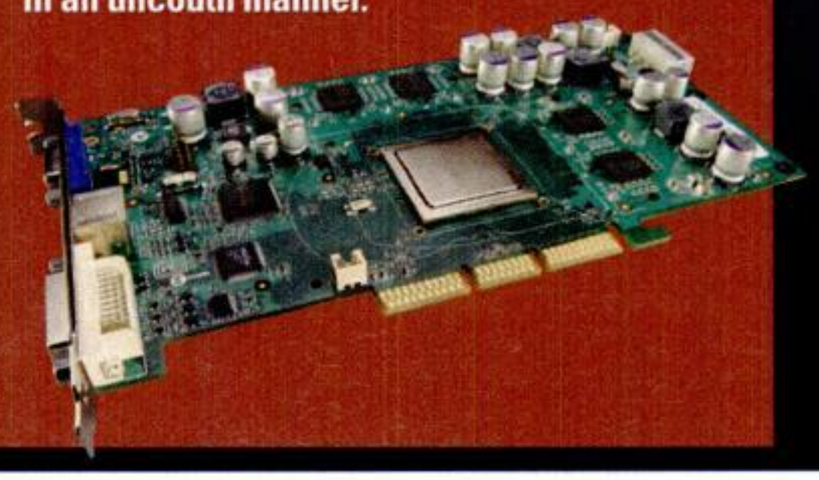


41 Notebook Upgrading

We take three common notebooks, evaluate them for weak spots, then rip 'em apart in an upgrading free-for-all. Look deep inside for the full story on what parts can and cannot be swapped with ease.

37 NV30: Anatomy of a Videocard

We begged and begged and begged until nVidia finally gave us a sneak peak at its new Radeon 9700 killer. The card is code-named NV30 and it's being fondled in an uncouth manner.



42 Gadget Guide

We gathered up the coolest, swankiest, most high-tech PC peripherals and paraphernalia, and ran it all through our editorial gauntlet. Anything that survived was then considered for this gift guide. The fun starts inside...

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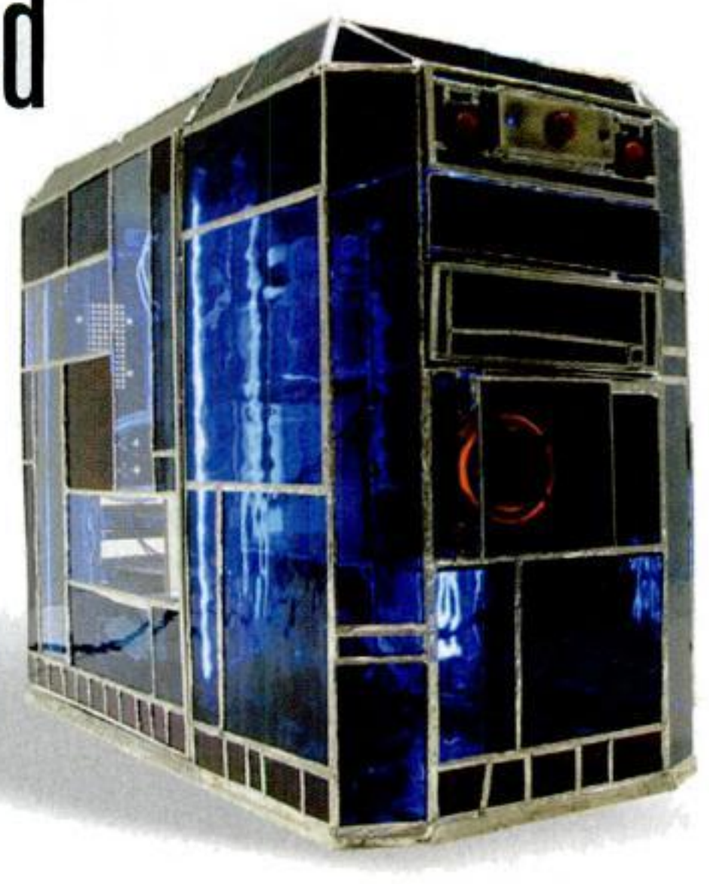
In/Out

You write, we respond

Honey, Look at What I Picked Up at the Crafts Fair!



This case has 195 individually hand-cut pieces of glass. It took me about three months to build. There were a lot of issues, mainly figuring out how to hold all of the hardware together without screws. The case has two Antec blue LED fans, one red LED fan, and two blue cold-cathode lights. It's a pretty good overall gaming computer; I mainly use it at my LAN parties to host *Medal of Honor*.

—JERAMI

MANAGING EDITOR KATHERINE STEVENSON RESPONDS: Lest there be any doubt that some people *worship* their rigs…

LET'S TALK TORQUE

I found the November issue comparison of the Athlon and Intel very interesting and informative, until you brought up the automotive analogy. You see, a V12 [which *Maximum PC* associated with the P4, and accused of lacking "brute torque"] has a very broad and flat torque curve throughout the entire RPM range, making it a popular road course engine. A more correct analogy would be comparing the Athlon XP to a turbocharged 231ci V6 (the engine that made Buick Grand National so hot in the 1/4-mile), and the Intel P4 to a 350ci small block V8. The Athlon, as you state in the article, is clearly more efficient and runs nearly as quick with less GHz. Don't change the name to *Maximum HP* anytime soon (wink, wink).

—GARY OSHUST

EDITOR-IN-CHIEF JON PHILLIPS REPLIES: Interestingly enough, as the November cover story was going to press, Gordon and I debated the direction of our car engine analogy. I was leaning toward an analogy that revealed the P4 as a powerful but inefficient motor—a sloppy V8 that boasts a lot of cubic inches (GHz), but doesn't necessarily get a lot of its potential power to the wheels.

Gordon, on the other hand, wanted an analogy that more accurately described each CPU's performance personality, inefficiencies notwithstanding. More precisely, Gordon was referring to old V12 motors that actually displaced fewer cubic inches than V8s of the same time period, but nonetheless made very formidable horsepower, albeit with less low-end torque. For example (and keep in mind that Gordon is old-school), a 1970 Ferrari 365 Daytona ran a 268ci V12 that made 363HP/319ft-lbs, whereas a 1970 Corvette ran a 454ci V8 that made 390HP/500ft-lbs. Gordon's analogy holds true, for published performance specs say the Ferrari hit 173mph, whereas the Corvette hit just 144mph, and had a slower 1/4-mile.

Of course, the Ferrari also cost a lot more than the slower, gruntier Corvette. Sound like the old P4 vs. Athlon debate, doesn't it?

SAY IT AIN'T SO

I disagree with your assessment of the GeForce4 MX 440 ["3D Card Grudge Match," October 2002]. While it certainly isn't a hot rod, you shouldn't have told your readers to "just say no." You could have at least mentioned that it was the best/fastest card you tested in the sub-$100 category, and that it did trounce the other two cards in the roundup [in its pricing category]. You seem to have forgotten that people savvy enough to read *Maximum PC* and build their own machines already know what they're buying when they purchase a $79 videocard. I must add that I have the Chaintech MX440 and it plays the *Comanche 4* demo (from your June CD) with everything turned on with no jerks or skips on my XP2000+/DDR333 machine.

—KEV STANFA

TECHNICAL EDITOR WILL SMITH REPLIES: It's great that you dig your GeForce4 MX board, but we think that any board without programmable shaders is overpriced at $80. If you go to Pricewatch.com, you can get a Ti 4200 board for a mere $100. We still say the Ti 4200 is a better value.

YOU GOTTA KNOW WHEN TO FOLD 'EM

What's up with $4,000-plus rigs (specifically the ones featured in your "Ultimate Gaming Hardware" article) not having rounded IDE cables? It's hard for me to believe

CUT, COPY, PASTE

➤In the November How To, we printed an incorrect URL for Stardock (the maker of *Object Desktop*). The correct URL is www.stardock.com.

➤In November's Intel vs. AMD feature, we incorrectly stated the *SPEC ViewPerf 7.0 Light-05 9* score for the 2.5GHz P4 as being 171fps, when we meant to write 9.171fps.

➤In our November "Mobo Minutia" article, in the "Resistance Is Not Futile" caption, we incorrectly identified the small, brown, surface-mounted components as resistors. This is incorrect—these parts are actually capacitors. But the smaller, black components in the same photo (the parts labeled with numbers) *are* resistors.

➤In the same article, we also oversimplified a few electrical concepts. Lest there be any confusion, the capacitor's role on a motherboard is to smooth out fluctuations in a DC signal. Additionally, an inductor's role on a motherboard is to filter out unwanted frequencies in an AC circuit.

➤In our November "Pocket Rockets" feature we printed the capacity for the Trekstor USA Thumbdrive as being 128GB. We meant 128MB.

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COMING NEXT MONTH

IN THE INCREDIBLE JANUARY ISSUE OF *MAXIMUM PC*

STOP SPAM DEAD!

Month in, month out, *Maximum PC* has rallied against underpowered components, software bottlenecks, and even fly-by-night vendors defrauding our readers. But we haven't yet challenged the scourge that even PC power users find difficult to contain, let alone defeat. We're talking about Spam. Junk mail. The bane of the good and righteous.

Well, enough is enough. Next month we treat Public Enemy Number One to our own special brand of minimum BS.

We'll show you where all the spam is coming from, and give you clear and actionable instructions to eradicate the offensive shite once and for all. And then we go for the jugular—we finger the King of Spam, the worst of all the perps, the rat bastard of all rat bastards.

HARDCORE PC CASES

If performance means anything to you, don't skimp on the perfect case for your next PC. We bring seven enclosures into the Lab, and subject them to grueling cross-examinations and full body-cavity searches. Find out which ones deserve to hold your most precious parts, and which ones simply fell apart.

THE SOFTY AWARDS

Newsflash: Even hardcore hardware hackers such as the *Maximum PC* editors use software now and then. Software is, after all, the yang to hardware's yin. So next month we present the first installment in what will almost certainly become an annual tradition: The Maximum PC Softy Awards. Stay tuned for the best code of the year.

Oops...We Did It Again

Regular readers of this section might be losing faith in our forward-planning abilities. In October, we promised a notebook upgrading story for November—but it's actually running in the issue you're now holding. Then, in November, we teased a case review roundup for December—but if you've read this far, you already know the article is planned for *next* month, January 2003. Sorry, folks. We'll seek treatment.

that with so much focus on aesthetics inside and out, these hardcore manufacturers don't splurge on $15 rounded IDE cables. Not that it makes any difference in performance or anything, but still.

—DAVID ASLANIAN

SENIOR EDITOR GORDON MAH UNG RESPONDS: At Voodoo PC, which sells PCs with case windows, the prevailing opinion is that the data integrity of meticulously folded cables is better than that of rounded cables. At Falcon Northwest, which eschews windows and instead focuses on exotic paint jobs, rounded cables are seen as unnecessary. According to Falcon President Kelt Reeves, "[Rounded cables] aren't really a whole hell of a lot neater than well-folded flat cables, and they up the price."

We should also note that many home enthusiasts use rounded cables to foster better airflow. This strategy makes sense when your cooling configuration is based on educated guesses, but OEMs don't have to take this approach. They have the time and intellectual resources to design fan and cable placement configurations that don't rely on cable rounding.

KICK ASS? HE THINKS NOT

What were you thinking? A score of 9 and a Kick Ass award for the Creative Labs MuVo USB Key ("Pocket Rockets," November 2002)? I had to check the cover of the magazine to make sure I wasn't reading *Minimum PC*.

The article mentions the MuVo's low capacity, and states that it's "more expensive than the other keys," and offers the "slowest [data transfer] of the pack—by far." This underperformer is given the highest verdict of all the USB keys and a coveted Kick Ass award? I must have missed the intent of the article entirely. I thought you were evaluating these things as USB keys, not for their ability to play MP3 files.

Of the eight devices tested, seven of them were rated either a 7 or an 8. Verdict scores like these are worthless to anyone who's actually considering one of these devices. This was not your best work.

—SCOTT BRUNELL

FEATURES EDITOR LOGAN DECKER RESPONDS: Down, boy, down! We agree that the Muvo verdict does seem way off kilter. Here's the deal: When we do review roundups, products that have been reviewed before retain their original verdicts. Our reasoning has always been that our testing is conclusive and our verdicts are final—there's no reason to rethink the verdict. If serious issues crop up with products after our verdicts are rendered, those issues are always addressed in our In the Lab section.

The MuVo received its original rating and Kick Ass award for its versatility and software-free MP3 playback. But in the "Pocket Rocket" roundup, as you correctly observed, the MuVo received the highest score when it wasn't the best USB key product. It should have been re-assessed for its usefulness primarily as a USB key. That would have landed it—as you probably guessed—at the bottom of the scale.

While we're on the subject, readers should know that M-Systems recently released a new version of the DiskOnKey, and it easily beats the pants off all the keys that were in our roundup (at least in terms of transfer speed). Check out page 34.

TOM MCDONALD: FALSE PROPHET?

After reading T. L. McDonald's article "Are PC Games a Dying Breed?" [Quick Start, October], I'm convinced you folks really are "minimum BS." Man, this article was stay-awake-at-night scary. I'm not looking forward to your great mag being renamed *Maximum Console*. I feel like someone just pulled the rug out from under me... and at age 55, it hurts. How do we explain the continued progress in videocards (and greater number of videocard manufacturers) when the number of PC game titles is falling off a cliff, and PCs are no longer cost-effective compared with consoles? My plans to purchase the latest and greatest gaming PC this fall doesn't make sense when I know of only one interesting new title release (Microsoft's new WWII fighter sim).

It took courage to print the Game Theory article. I would imagine you folks are as shook up as I am. Looks like we'll both have to think outside the box... eh... make that outside the Xbox.

—CHUCK STEWART

EDITOR-IN-CHIEF JON PHILLIPS REPLIES: Tom McDonald has autonomy to opine however he pleases, but sometimes his rants don't jibe with sound, logical thought.

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PC games aren't going away anytime soon for the following reasons:

➤The most visually demanding 3D games will always be one step ahead of the console platforms, and will therefore demand hardcore PC acceleration. Sure, B-titles will run on consoles, but B-titles have never established the PC as the most advanced and elite of all gaming platforms. As long as game developers like Carmack and Sweeny care about their craft, PC games will thrive.

➤Common TV sets are painfully low-res, and aren't capable of rendering the visual splendor of 1024x768, let alone 1280x1024 and higher. So as long as people buy games for their visual appeal, the PC monitor will always serve as the best possible content venue.

➤First-person shooters, realtime strategy games, and many role-playing games don't play well on consoles. These games need keyboards and mice. PC have keyboards and mice. Consoles don't. McDonald alludes to the controller issue, but I think he doesn't pay it enough due. The console vendors have had years to offer proper game control for the PC's most popular genres, and still haven't nailed it—and I don't think they ever will.

I wouldn't quit upgrading my PC anytime soon. Development attention has been shifting to consoles, certainly, but as gaming genres continue to become more Balkanized, the PC will only grow stronger with the genres it already owns.

THE AGONY OF OPTICAL DEFEAT

I have a problem with your publication's award of a Perfect 10 verdict to CD writers that can't make 1:1 copies of all CDs. I agree that speed is important, but by not subtracting points for drives that will not make reliable copies of almost all discs, you're misleading your readers.

Imagine reading your publication and seeing the vaunted Kick Ass award, and based on that, rushing out to buy the drive, only to find that it won't do what you thought it would. I hope that you get back to your roots, and include all the information that power users want and need to evaluate the products you review.

—JOHN M. PELUSO

FEATURES EDITOR LOGAN DECKER RESPONDS: We understand your frustration, but what would *really* be misleading would be for us to claim that *any* drive we tested would be able to make 1:1 backups of all CDs. Nobody's got a drive that can guarantee this. Well, maybe the CIA or NSA has one, but they're probably not using it to back up *GTA3*.

There are more than 20 major copy-protection schemes out there, and the majority of them are tweaked on a regular basis to keep crackers at bay. A drive that can copy a particular disc today might not be able to tomorrow. Anyway, the point is moot because the days of making 1:1 backups of your copy-protected CDs are numbered. Smart companies are moving away from fancy software sleights-of-hand, which are inevitably defeated. Instead, you'll find that future copy-protection schemes will be physical in nature.

For example, the latest iteration of SecureROM is said to use special CD-R media, so trying to duplicate these discs using regular media is like trying to copy money on a photocopier—you won't fool anybody. Another company releases its software on discs that have a hole literally drilled right into the surface of the media. If the hole can't be found in just the right place, the program won't run.

FALCON ON WARRANTIES

I know system roundups like those in your October issue are not easy to do, and the losers always gripe. But what I have to bitch about in no way diminishes the appreciation I have for your including us. That said, I'm really disappointed in the way *Maximum PC* handled the issue of the competitors warranties. Your article dedicated a half-page to how our companies are going to support these products, yet you practically penalized Falcon Northwest for being the only company *not* to void manufacturer's warranties, and praised our competitors for their modifications with no mention of the consequences.

Specifically: Our competitors overclocked their ATI Radeon 9700 cards. This isn't like nVidia's overclocking sliders, which are part of nVidia's own driver. Both Alienware and Voodoo overclocked by using Entech *PowerStrip*. This $30 add-on was never even mentioned in the text of the article, nor the software bundle. You didn't mention that overclocking voids ATI's five-year warranty on the card. Alienware and Voodoo take responsibility for only one year of the warranty, so the customer gives up four years of warranty for that overclock—an important factor if you're intentionally overheating a videocard.You might have also mentioned ATI's stance on the subject, which I got from ATI's Toshiyuki Okumura: "We had a discussion with Voodoo and Alienware. We will not take back any boards which have been overclocked. We have special ways of finding out if the boards have been overclocked (can't tell you how, but we know). They are well aware, and they are going to overclock at their own risk. Basically, our stance is that we do not recommend overclocking cards since doing so voids warranty. If an end user decides to use third-party utilities to do this, they do so at their own risk."

"Gee, thanks for not mocking the only company that doesn't hose its customers out of four years of warranty for an extra 2fps in UT2003."

Instead of raising these important issues as a caveat to the benchmark success of the Voodoo and Alienware rigs, you wrote of Falcon, "We won't mock the company for its clocking decision."

Gee, thanks for not mocking the only company that doesn't hose its customers out of four years of warranty for an extra 2fps in *UT2003*.

Are these overclocks worth the loss in warranty? That should be up to the customer. But I believe you had a journalistic responsibility to at least inform your readers of the significant downside. There are some lines that should only be crossed with the customer having full knowledge of what they are sacrificing.■

—KELT REEVES,
FALCON NORTHWEST PRESIDENT

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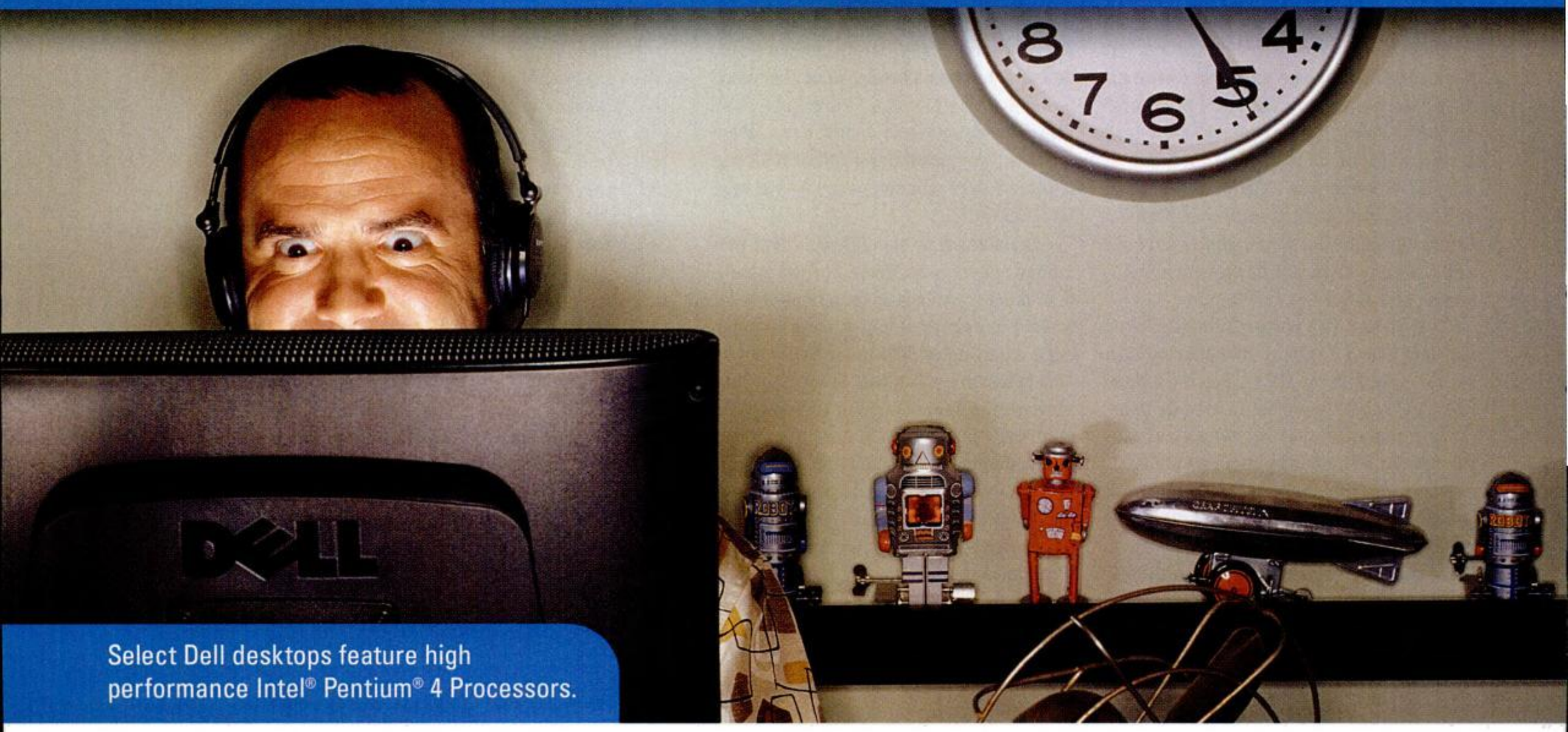

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Quick Start

The beginning of the magazine, where articles are small

Pure Power Preview 2003

We may not be psychics, but we know how to read between the lines. Here's a quick peek at the most important technology headed for your PC in 2003

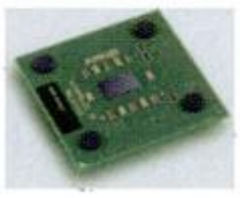
Processors: The Year Ahead

A quarter-by-quarter look at the brawn behind next year's brains

Q1

AMD: In the new year, AMD will finally release its Barton core. Using an improved 0.13-micron process, Barton doubles the L2 cache in the Athlon XP to 512KB. Clock speeds aren't definitive yet, but we expect Barton to tip in at 2.25GHz to 2.4GHz.

INTEL: By the time you read this, Intel should be well on the way to releasing a 3GHz Pentium 4 using the Northwood core and with HyperThreading enabled. What Intel will do this quarter, however, depends on what AMD does. Considering AMD's on-again, off-again track record with its own release schedule, Intel could take a breather this quarter on the desktop side, and hammer away at mobiles with its Banias chip, which is designed to save power.



Q2

AMD: The company's much-hyped 64-bit chip was expected to sample to customers in late 2002. AMD gagged, however, and may not introduce Hammer until the end of Q2 2003. The Hammer chip intended for desktop users will be called Athlon in some way or another, and will have a "performance rating" greater than 3500 (what the actual clocks will be is unknown). Accompanying the new chip will be the 8000-series chipset, which includes support for HyperTransport as well as the CPU's on-die memory controller.

INTEL: This quarter, Intel will likely dial in 3.26GHz Pentium 4s on the 533MHz bus. The company is also expected to release the Springdale chipset in the first half of 2003. Springdale will likely be a dual-channel DDR333 chipset supporting both the 533MHz frontside bus and a new 667MHz frontside bus.

Q3

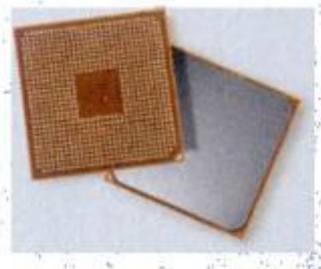
AMD: Although it's hard to say what AMD will do, it's a good guess that the company will hunker down with its new Athlon and Opteron, the server version of Hammer, and continue to crank speeds up. Expect performance ratings that are competitive with Intel's offerings.

INTEL: Flexing its process muscle yet again, Intel is expected to release a .09-micron (90nm) chip code-named Prescott at the end of the quarter. Rumors say Prescott will carry new instructions, multiple cores, and very large amounts of cache (a nice bonus made possible by the process technology). Intel may even call the new chip "Pentium 5." Intel will complement Prescott with the Springdale chipset and a 667MHz bus. Most predict Prescott will debut at speeds greater than 3.2GHz, but we think it'll crack the 3.5GHz range.

Q4

AMD: AMD's roadmap gets hyper-secret toward the end of the year, but the company has plans to get its own 90nm process out by the end of this quarter. Expect AMD Athlons using the Hammer core and the new process by the end of the year.

INTEL: Intel should settle down with its new 90nm process and reach up to the 4GHz range by the end of the year, if all goes well. The company should also be well into development of a 65nm CPU, code-named Nehalem, which is scheduled for 2005. Nehalem is rumored to be a completely different chip than the NetBurst-core P4.



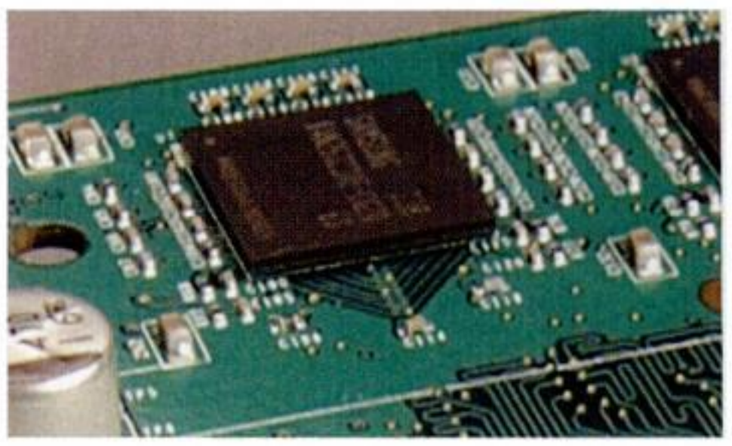
3D Accelerators

2002 was a banner year for 3D gamers, but 2003 will be even better

Expect to see fully DirectX 9-compatible parts from ATI and nVidia priced for the mainstream consumer. That's right, programmable shader cards will be priced from $100 on up—no longer will they only be for the gaming elite.

ATI has already announced the Radeon 9500, 9500 Pro, and 9700. These boards will be priced between$180 and $300, and feature the same R300 core that powers the Radeon 9700 Pro. The 9700 is a slower-clocked version of the 9700 Pro (275MHz core/270MHz memory, down from 325MHz core/310MHz memory in the Pro). We expect nVidia to follow with clocked-down versions of the upcoming NV30.

2003 should also be the year of DDR II. This new memory type allows accelerator manufacturers to crank the memory clock on equipped boards from around 300MHz to 500MHz and beyond. We've seen DDR II boards working in tech demos already, so expect to see NV30 and R300 boards with the new memory early next year.



It doesn't look so special, but this little chunk of DDR II RAM will run at 500MHz, for an effective clock speed of 1GHz!

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Hard Drives

Fat drives, fat pipes

Last year's top hard drives—which all ran at 7200rpm and pierced the 100GB capacity barrier—were led by the Western Digital 1200JB with its 8MB buffer and predictive caching (**www.westerndigital.com**). But the competition isn't standing still. In 2003, expect all the performance drives from Seagate, IBM, and Maxtor to sport a large buffer.

But 8MB is *so* last year, and word has it that ambitious vendors will pack drives with even larger buffers. Areal density, which helps performance by packing all your data closer together on the disk, is growing as well. Early 2003 drives are already expected to fit 80GB on each platter, which is twice the density of this year's 40GB-per-platter standard. This greater density allows for not only jumps in data-fetching performance, but also gigantic capacities, such as the 320GB promised by the Maxtor MaXLine II (**www.maxtor.com**). Two hard drive manufacturers we spoke to even hinted at triple-digit areal densities by the end of 2003, making half-terabyte drives almost within reach of the average Joe.

This year also heralds the arrival of Serial ATA interface, which will feel like a breath of fresh air—probably because the new, slim SATA cables allow for better airflow than the chunky, parallel ATA ribbon cables with which we're all familiar. More importantly, SATA does away with the old slave/master relationship for each channel, and provides every device with its own path to the 150MB/sec bus.

The initial wave of SATA products will also support an array of interface improvements, including command CRC error correction on top of data-only safe guards. The Seagate Barracuda V (**www.seagate.com**) and Maxtor DiamondMax Plus 9 are both SATA, and should be available early in 2003. The Maxtor drive is also available in a parallel version; see our review on page 89.

Maxtor once again breaks areal density records by packing 40GB on each of the MaXLine II's four platters. That's so good, we can even forgive the drive's stupid spelling.

2003 is going to be all about Serial ATA, the interface used in Seagate's Barracuda V shown here.

The 137GB Barrier—Read Before You Leap!

Unfortunately, only the most recent Microsoft OSes and motherboards have support for drives larger than 137GB. The problem is a 28-bit addressing scheme that's been in use since the last size barrier of 8.4GB was broken in 1998. The fix is to update your system BIOS and operating system to support 48-bit addressing, which will keep you out of trouble until drives hit 144 petabytes. On the OS side, only Microsoft Windows XP and 2000 have official support. It's safe to say that if your motherboard was manufactured in the past year or so, support for 48-bit addressing will be available via a BIOS update. If your board is too old to handle large drives, no problem: Just drop in an IDE controller card and you should be good to go.

FAST FORWARD BY TOM R. HALFHILL

Waiting for the Bus

AMD recently boosted the effective frequency of the Athlon's frontside bus to 333MHz, a welcome 25 percent increase over the previous 266MHz. That's the good news. For AMD, the bad news is that Intel's Pentium 4 is still 60 percent faster at 533MHz. And for everybody, the worse news is that the bus frequencies of both processors lag far behind their skyrocketing core frequencies.

The growing mismatch between bus speeds and core speeds is wasting valuable CPU performance. Multigigahertz processors can't deliver all the performance you're paying for because they spend more of their time waiting for data. They're like a turbocharged V8 engine choking on a fuel injector with a clogged gas jet.

In August 2001, I wrote about the huge gap between CPU clock speeds and memory latencies. Now I'm talking about a bandwidth gap. Bandwidth determines how much data a CPU can transfer in one gulp; latency is how long it takes. The latency gap is jaw-dropping—in 20 years, CPU speeds have increased more than 300x while DRAM latencies are only about 4x faster. But now the bandwidth gap is growing, too. Since 1999, core frequencies have zoomed from 500MHz to 3GHz (6x). Frontside bus frequencies have crawled from 200MHz to 533MHz (2.6x).

That comparison is generous because actual bus frequencies have increased to just 167MHz—the base clock frequency of today's fastest frontside bus. Both AMD and Intel use clever tricks to achieve higher effective bus speeds. The Athlon transfers two bits of data per clock period, effectively doubling its 167MHz bus to 333MHz. The Pentium 4 transfers four bits of data per clock period, effectively quadrupling its 133MHz bus to 533MHz.

In one sense it's a moot point, because memory vendors are straining to deliver DRAM that keeps up with those high effective bus speeds. The Athlon's 333MHz bus provides about 2.7GB per second (GB/sec) of peak bandwidth, which matches the memory bandwidth of PC2700 DDR-SDRAM. The Pentium 4's 533MHz bus provides 4.2GB/sec of peak bandwidth, which matches the memory bandwidth of PC1066 RDRAM. But PC3200 DDR-SDRAM is already available, and dual-channel DDR-SDRAM or RDRAM adds more bandwidth to the memory subsystem without improving the CPU's bus bandwidth.

Faster buses are coming soon. In October, IBM announced the 1.8GHz PowerPC 970 with an effective bus frequency of 900MHz and 6.4GB/sec of peak bandwidth—29 percent more than the Pentium 4. Apple is a rumored customer for this CPU, which would be a relief for long-suffering Mac fans. If IBM can drive a bus at 900MHz, Intel and AMD probably aren't far behind.

Tom Halfhill was formerly a senior editor for Byte *magazine and an analyst for* Microprocessor Report. *He is now a technical writer/analyst in Silicon Valley.*

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Optical Drives

Blue lasers are coming, and, yes, they're going to war

First, the good news: Blue laser technology may finally be on its way to consumers in 2003. As a result, today's optical discs, whose capacities reach just about 10GB in dual-layer DVD media, will be trumped by tomorrow's blue laser discs, which can hold up to 50GB of data (if proof-of-concept prototypes are to serve as indicators). Blue lasers can pack far more data onto discs because their beam diameters are much more fine—405 nanometers compared to the 630 nanometers mustered by the red lasers used in today's CD and DVD drives. Think of it as writing with an extremely sharp and thin pencil lead instead of a dull and thick one.

Then there's the bad news: Once again, it looks as if another tedious standards war may confuse consumers and inhibit adoption. On one side, nine electronics companies (including Philips, Pioneer, Samsung, and Sony) are backing a standard they call Blu-ray, which can write up to 27GB per disc. On the other side, Toshiba and NEC have designed their own blue laser system, which holds up to 30GB per disc and boasts backward-compatibility with existing DVDs (which Blu-ray doesn't offer).

As part of its own research into blue laser technology, Philips is also developing smaller discs and formfactors (such as the mini-optical drive pictured below)for use in digital cameras and handhelds.

We'll go out on a limb and say you'll be able to buy some type of blue laser technology by Q4 2003.

Higher-density media suffers greater susceptibility to data loss from scratches. So expect to see the return of cartridges, such as the one for this blue-laser disc from Toshiba.

Philips' 3cm blue laser disc for portable devices can hold up to 1GB of data. The player size is expected to shrink even further than the model pictured here.

Where Is Creative's P10?

In July, when we first trumpeted the launch of 3Dlabs' P10 graphics chip, we reported that the workstation GPU would also be used in consumer-level videocards sold by parent company Creative Labs. No, we weren't making up stories—we were simply reporting what 3Dlabs told us when we first started our coverage.

Now, some five months later, there's no sign of a P10-fueled Creative Labs videocard, and Creative says none is in the works. We've never been lucky enough to speak directly with a Creative rep about the launch, but a rep did send us an e-mail stating that Creative is "not currently aware of any timeline for a consumer graphics product in the U.S."

Hmmm. Very curious—especially considering how many times we've mentioned the consumer launch in the magazine during the last few months. You'd think someone from Creative Labs would have called or e-mailed to inform us of our poor reporting.

Maximum PC suspects that Creative did intend to launch a P10-fueled consumer card in the U.S., but got cold feet after seeing the performance bars set by ATI and nVidia. No one at Creative Labs will confirm our suspicion, so we'll just leave you with this:

The Top 10 Reasons Why Creative Labs Hasn't Released the P10:

10. Creative is waiting for the P13—with 30 percent more P!

9. Engineers ran out of Funyons and Mountain Dew; lost will to continue.

8. Research says 3D acceleration is out, 2D acceleration is in.

7. Chip is neither creative, nor concocted in a lab.

6. The board design was foolishly subcontracted to BitBoys Oy.

5. Roadmap has it penciled in for the mysterious "Q5."

4. Lead engineer took four-month sabbatical for "Survivor 6: Albuquerque"

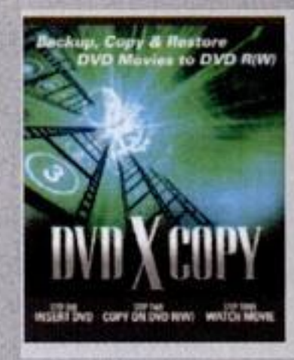
3. "The 9700 will leave us crying for mama."

2. All retail boxes mistakenly labeled "Powered by P-Diddy!"

1. Ran out of antistatic bags.

FUN-SIZE NEWS

One-Step DVD Backup Software—Almost



The dream of making 1:1 backups of your DVD movies onto recordable DVD media—including menus and special features—has become a reality, according to 321 Studios, the makers of *DVD X Copy*. Since the Motion Picture Association of America has already stated its intent to sue over the software, 321 Studios is delaying its release pending a declaratory judgment from the court that affirms software does not in fact violate the Digital Millennium Copyright Act. That statement will or will not have been made by the time you read this—find out at **www.dvdxcopy.com**.

Wear Pants in Washington

The Washington State Supreme Court has declared that "up-skirt" cameras don't violate the state's voyeurism laws. The court conceded that taking these images (often shot with those ubiquitous X10 cams) and posting them on the Internet represents "disgusting and reprehensible behavior," but added that individuals can't reasonably expect privacy in public places, even underneath a sundress. So they won't be peepless in Seattle anytime soon.

XP Media Center Ditches Copy Protection

HP's "digital media" PCs, outfitted with Microsoft's Windows XP Media Center Edition, won't be saddled with copy protection that would prevent users from sharing recorded media among different PCs. Although Microsoft had previously decided to restrict playback to the PC that recorded the video, the about-face may be attributable to Sony's VAIO PCs that also allow users to copy their recordings to CD or DVD, or even distribute them across a network.

SETI@Home Gets New Digs

SETI@Home, the distributed computing project that uses your CPU's idle time to crunch data in the search for aliens (the outer-space kind), is wrapping up the current project in Arecibo and moving to a radio telescope in Australia that can "see" a wider range of sky and search multiple areas at the same time. Work has also begun on a new program called AstroPulse that will search existing SETI data for signals from pulsars and black holes that may have been missed by the original program. Check it out at **http://setiathome.ssl.berkeley.edu/index.html**.

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Unleash the wrath of the gods

The creators of Age of Empires® 1 & 2 welcome you to a time when mortal man came face to face with the power of the gods. Join in the greatest battles of Greek, Egyptian and Norse mythology. Build majestic temples, farm the fertile valleys, and seek out wealth in distant realms in this epic challenge to create the strongest ancient civilization. Rated one of the "hottest PC Games at E3 2002" by *Game Informer* and one of the "top 10 PC Games of 2002" by PC Gamer, Age of Mythology will change the way you treat your PC. You won't play it. You'll worship it.

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3D Phone Gaming

Eyematic brings a new dimension to your cell-phone screen

Snakes, *Breakout*, and *Tetris*... if you're lucky. That's about as exciting as it gets these days in cell-phone gaming—simple diversions to pass time in the checkout line. But Eyematic—the inventors of "facial sensing" technology that captures facial expressions for animators—is raising the bar. You can forget about sprites, because Eyematic delivers true 3D character models, and can even render backgrounds on the fly. Skeptical? So were we, until we saw the demos. Just check out the screens below.

No special compression schemes or Java is required. According to Steve Hartford, VP of marketing for Eyematic, the secret is just old-fashioned airtight code. "Many of our programmers are old-school," he said. "Writing tight, optimized code is largely a thing of the past on PCs, but in a cell phone, every byte and processing cycle counts."

At least until our phones get 3D accelerators.

The games are currently available to Verizon Wireless "Get It Now" customers who have Z-800 or Motorola T-720 color screen mobile phones. Owners of Nokia, Sharp, Ericcson, and Texas Instruments phones should have support in the future.

Yes, those are particle effects raining over the hapless kitty. Particle effects on your cell phone—these *are* wild times.

The fuming dragon shows off the transparency effects made possible by Eyematic.

Lara Jr. here is showing off more particle effects in the flames coming off her sword.

Wireless Computing

Wireless power is coming to a desktop near you

You might have Wi-Fi access, a Bluetooth PDA, and an IR printer, but you are anything but truly wireless. Sooner or later, you're going to have to deal with the "last wire" problem—power cables. But now even those may be a thing of the past thanks to the wire-free power transfer technology being introduced by MobileWise, a semiconductor company.

It all starts with the MobileWise Electricity Base, which contains hundreds of tiny exposed contacts that are linked to a power controller in the surface of the base. Whenever a MobileWise-enabled device lands on the base, its own contacts connect with the base's contacts, and a closed circuit is formed. The power controller in the base assesses the power needs of the device—be it a laptop, PDA, or mobile phone—and supplies the appropriate amount of power. The base can provide continuous power to devices in use or recharge them when they are idle (and even turned off).

MobileWise says that the mat emits no harmful radiation and doesn't cause radio interference. Metallic or magnetic objects can be placed on it (including floppies and credit cards) without damage to either. You can spill a cup of joe on the surface, or even lick it, without shorting out the base.

Acer is the first manufacturer to have announced that it will incorporate MobileWise technology into its notebooks and PDAs, which are expected to ship in the first half of 2003.

The MobileWise Electricity Base could liberate you from power cables once and for all.

GAME THEORY

BY THOMAS L. McDONALD

Chess, Anyone?

It's been a quiet five years for computer chess since IBM's Deep Blue beat the petulant and psychologically unstable world chess champion Garry Kasparov. Deep Blue's reward for giving the computer world one of its Holy Grails—the computer that could beat a grandmaster at chess—was ignominious. The supercomputer was dismantled, its parts scattered, its core system reduced to proving chess opponents for a web site.

Feng-Hsiung Hsu, the system architect and chip designer of Deep Blue, details this quest in a frankly fascinating new book called *Behind Deep Blue* (Princeton University Press, $27.95). "In 1999," he remarks near the end, "a cheap PC in a college dorm with a few chess chips, fabricated in say 0.35 micron CMOS, should be able to [beat Kasparov]. The reality in 2001 is that a palmtop computer like a Compaq iPaq, equipped with a 0.13 micron CMOS chess chip would have a decent chance to beat him."

He's closer than he realized. After a five year lull, a series of high-profile matches once again pit the grandmasters of chess against machines. This time, however, the contests involve off-the-shelf consumer software rather than a supercomputer, as grandmasters Larry Christiansen, current world champion Vladimir Kramnik, and former champion Gary Kasparov face, respectively, *Chessmaster 9000*, *Deep Fritz*, and *Deep Junior*, the three leading chess brains.

The Christiansen match is more of a PR stunt by Ubi Soft than a serious match, but Christiansen is still a leading player. His defeat by a standard version of *Chessmaster* running on a single 2.66GHz processor was an indicator of how far chess AI has come. *Deep Fritz* and *Deep Junior*, on the other hand, are more powerful versions of consumer programs, each running on a desktop with eight CPUs.

By comparison, Deep Blue had 64 boards specially programmed for chess (one for each square), weighed 1.4 tons, stood six feet high, and required a support team of 20 people. It could examine 200,000,000 moves per second compared with the 6,000,000 moves which *Deep Fritz* and *Deep Junior* can manage. That doesn't necessarily mean Deep Blue would beat them, since it relied on pure power, not game playing finesse. The current software doesn't analyze as many positions, but it analyzes them better.

And the results? At press time, Kramnik had his head handed to him in two consecutive games, but the score is tied. Kramnik was clearly rattled by the emotionless machine, an opponent he could not "read" and was unable to psych out. Kasparov postponed his game until December, and if Kramnik ultimately loses the match, Kasparov may just go on postponing it. The humiliation of being defeated by one of the world's most powerful computers was bad enough, but being defeated by a desktop would simply be too much.

Tom McDonald has been covering games for countless magazines and newspapers for 11 years. He lives in the New Jersey Pine Barrens.

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Pioneer *sound.vision.soul*

pioneerelectronics.com

A recordable DVD format that is already accepted by millions.

The time has come for recordable DVD. Now that you're ready to archive your home movies on DVD and toss those old VHS tapes, you want to make sure that you're choosing the best technology for the job. Join the millions of people who have already chosen DVD-R and DVD-RW to record and archive their own videos with crystal-clear DVD quality.

DVD-R is THE most compatible format. Let's face it, recorded DVDs are most valuable when you can play them back on other DVD players or computer drives. A recent test conducted by *Digital Video Magazine* indicates that DVD-R discs are more likely to play back on other DVD players than any other format of recordable disc tested. And with the price of blank DVD-R media typically being much lower than other formats, recording is also affordable. So if you want to burn a disc and then be able to share it with friends and family, this is the technology you'll want to use.

Pioneer DVR-AO4

DVD-R and DVD-RW are the gold standard. DVD-R and DVD-RW have become the de facto standard for DVD recording with millions of products already in use. DVD-R has been used throughout the professional video and entertainment industries for years and computer manufacturers like Sony® and Compaq® are currently offering DVD-R/RW drives in their latest line of products. Apple® also made the move to install DVD-R drives in many of their new machines.

Pioneer DVR-7000

Why is the DVD Forum important? The DVD Forum was originally formed to create the DVD Video standard. Now, the group that made DVD possible has taken it to the next level, bringing together consumer electronics and computer manufacturers with blank media companies to set the standard for recordable DVD. The DVD Forum approved DVD-R and DVD-RW as official DVD recording standards. Don't settle for imitations. If you want genuine DVD recording, look for the official DVD-R/RW logo.

AV PC DVD R/RW COMPATIBILITY

What are you waiting for? Whether you want to create a DVD of your wedding, a recent family vacation or your child's first piano recital, DVD-R/RWs offer just what you need to burn a disc that can be shared with friends and family. Now is the time to get started. For more information, go to www.pioneerelectronics.com.

DVD Format Comparison	DVD-R/RW	+R/+RW
DVD Forum-approved Format	YES	NO
Original Equipment Drive Manufacturers	Pioneer Panasonic Hitachi LG Toshiba	RICOH
Drives shipped to Market (projected Q4 2002)[1]	3,284,000	1,490,000
Formally supported by DVD Player and ROM Drive Manufacturers[2]	68%	<5%
Compatibility with Existing Players[3]	DVD-R 88% DVD-RW 65%	+R - NA +RW -59%

1. Source: Techno Systems Research
2. Source: Pioneer Electronics Inc.
3. Source: *Digital Video Magazine*, July 2002

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Head2Head

A showdown among natural PC competitors

THIS MONTH: NOISE-CANCELING HEADPHONES

Noise-canceling headphones have come a long way. The original military-grade headsets cost hundreds of dollars and resembled two cantaloupe halves, but current consumer models are quite affordable and look like normal 'phones. The modern models also purport to cut background noise by about 10dB, a 70 percent reduction by the logarithmic decibel scale—not bad if you want to enjoy awesome 3D positional sound in games without suffering the din of eight purring case fans.

Here's how the technology works: A tiny microphone on the headphones picks up ambient sound before it reaches your ears. Then, an equal-but-opposite signal is piped into your ear canals, effectively canceling out the noise. The scheme is really only effective against low-frequency sounds, so if you want to dull the racket of, say, screeching hyenas, you'll have to buy full-size headphones that fully encompass your ears.

Here, we take a look at two affordable offerings from Sony and Panasonic. Let's see if these cheap earmuffs can yield expensive-sounding results...

—OMEED CHANDRA

PANASONIC RP-HC1000

MAXIMUM PC KICK ASS PRODUCT

Sound quality (normal mode): These certainly aren't audiophile headphones, so if you're looking for studio-quality sound reproduction, you'll have to look elsewhere. For the money, though, the Panasonics pump out relatively rich sound with good clarity. The Panys also deliver more bass punch than the Sonys, which sound a little high-pitched and tinny by contrast. Also, thanks to their closed-back design, the Panasonic headphones even muffle background noise a bit when the noise-canceling switch isn't thrown.
Winner: Panasonic

Sound quality (noise canceling mode): We're comparing noise-canceling headphones this month, so sound quality with noise-canceling turned *on* is obviously more important than sound quality with it turned *off*. Fortunately, Panasonic delivers the goods: While listening to a CD in a car that's driving at highway speeds, music was clear and relatively unimpeded by background noise. We should also note that noise cancellation can introduce a slight hissing sound—some people never notice it, and it's essentially inaudible during gaming or music playback. That said, the Panasonic's hiss was far less pronounced than the hiss of the Sony set.
Winner: Panasonic

Noise cancellation: The Panasonic and Sony headphones both sport effective noise-cancellation mechanisms that dramatically reduce low-frequency ambient noise, but the Panasonics do a slightly better job. Also, thanks to the over-the-ear design, the Panasonics cut out some higher-frequency sounds as well, while the Sonys do not. Both of these headphones produce a hissing sound when noise canceling mode is enabled. In most environments, the sound isn't noticeable in the Panasonics, and it didn't interfere with our listening enjoyment at all. In contrast, the Sony's circuitry generates a prominent hiss that can be quite irritating. **Winner: Panasonic**

Comfort: We generally prefer the comfortable fit offered by closed-back headphones, but not in this case. Panasonic made these headphones just a tad too small, so for most people they don't quite enclose each ear. They feel OK for awhile, but become slightly uncomfortable after long periods of wear. Thus, the generic design of the Sony phones wins this contest by a hair.
Winner: Sony—but the battle was close

Versatility: Both headphones come with a handy carrying bag and easily fold up into similarly small proportions for storage. Sony also tosses in an adapter that allows the MDR-NC5 to be plugged into a standard airplane audio jack, a useful extra that Panasonic overlooked. The RP-HC100 and MDR-NC5 each run off of a single AAA-size battery, and have a rated battery life of 50 hours and 46 hours, respectively. We'll take these battery-life claims on good faith, because we didn't end up wearing out the batteries on either set of headphones during testing.
Winner: Sony

MAXIMUM PC VERDICT

RP-HC 1000
PANASONIC

www.panasonic.com
$90

9

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SONY MDR-NC5

Sound quality (normal mode): Despite the $80 price tag, the Sony headphones look like a typical $20 pair. Unfortunately, they also sound like a $20 pair. Audio is a little on the high-pitched side, at least compared with the deeper, richer vibes of the Panasonics. But let's make this clear: The Sony headphones don't sound bad, per se. It's just that for $80, we'd like to hear something better.
Winner: Panasonic

Comfort: The MDR-NC5's physical design is nothing special. The 'phones offer about the same level of comfort that one would expect from pretty much any pair of standard, open-back headphones. We generally find closed-back headphones like the Panasonics to be more comfortable, but in this case, we preferred the fit of the Sonys for long periods of listening.
Winner: Sony—by a hair

Versatility: Both headphones can be folded up into small proportions if need be, and both come with a handy carrying bag. That said, when unfolded to their full size, the Sony 'phones are slightly smaller than the Panasonics. And the Sonys alone come with an adapter that allows the headphones to be plugged into a standard airplane audio system. This is a thoughtful touch, seeing as how noise-canceling headphones are especially useful on plane flights. As for battery life, the Panasonics are rated at 50 hours on one AAA battery, while the Sonys hit just 46 hours—but that's a trifling difference.
Winner: Sony

Sound quality (noise canceling mode): Throw the little switch next to your right ear, and the noisy world around you fades away—only to be replaced by an annoying hiss, care of the MDR-NC5s. If it seems like we're beating a dead horse by repeatedly emphasizing the hiss, let us assure you that it's only because it really is *that* annoying, especially when listening to music. Certain frequencies of background noise only exacerbate the problem. For instance, when listening to a CD while driving in a car, putting the MDR-NC5 in noise-canceling mode resulted in a warbling effect that made us wonder if we were listening to a vinyl record. Sure, you could crank up the volume to drown out the hissing, but wouldn't that defeat the purpose?
Winner: Panasonic

Noise cancellation: Sometimes, the only thing you want to hear is silence. Unfortunately, Sony doesn't want you to hear silence—at least not while you have these headphones on. With noise-canceling mode enabled, the Sony 'phones emit an aggravating hissing sound even in very quiet environments. We wore the Sony headphones in a dead-silent room, and actually found that it was quieter with noise canceling turned *off*. To their credit, the 'phones do reduce background sound considerably in noisy environments. But the Sony technology has limited effectiveness against higher-frequency sounds, because it uses an open-ear style (as opposed to Panasonic's closed-ear design).
Winner: Panasonic

MAXIMUMPC VERDICT

MDR-NC5
SONY
www.sonystyle.com
$80
6

THE UPSHOT

There's no contest: The Panasonics hold a distinguished lead in sound quality and noise-canceling ability. In fact, the only clear advantage offered by the Sony MDR-NC5 set is its inclusion of an adapter for use with airplane sound systems. Besides, we just can't get over the irritating hiss that's a byproduct of the MDR-NC5's noise-canceling mechanism. Aside from that, it's not that the Sony headphones are all that bad—it's just that the Panasonics are so much better.

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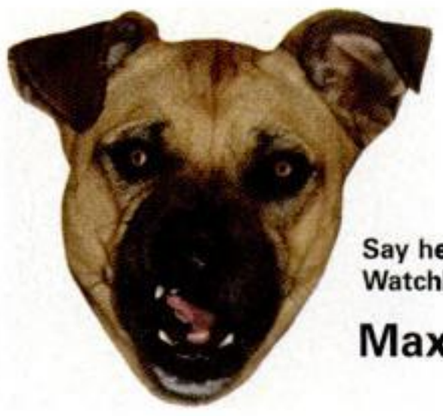
WatchDog



Say hello to **Harley**, WatchDog of the Month.

Maximum PC takes a bite out of bad gear

THIS MONTH: The WatchDog goes after...

> Hard Drive Manufacturers > Visiontek > Lynx Touch > Minolta

Hard Drives Get Fatter, Warranties Shrink

If the three-year warranty on your hard drive has you feeling all warm and fuzzy, prepare to get doused with cold water. The top three manufacturers of hard drives have reduced the long-standing three-warranty on hard drives to just 12 months. Hard drive manufacturers have been considering reducing warranties for some time, but no one would make the first move. That is, until Maxtor announced its one-year warranty this fall. Seagate and Western Digital quickly followed suit, and IBM officials told us they're also mulling over such a change.

So why the shorter warranties? The Dog interviewed officials at all three companies to find out how consumers are best served by getting one-third the warranty they're accustomed to. The companies cited varying reasons.

Maxtor VP Steven DiFranco said one of the main reasons is to get its hard drives in line with the one-year warranties that most OEMs offer. DiFranco said Maxtor must put aside millions of dollars to cover the cost of replacing hard drives. Because few drives are ever actually returned, the cash sits around for three years doing nothing. That money would be better spent on such things as R&D or promotion. The Maxtor DiamondMax and Fireball drives that shipped after October 1 are covered by the new one-year warranty. Drives that were already on store shelves before that date and that indicate a three-year warranty will continue to operate under the three-year plan. Maxtor's new MaxLine series of drives for servers and corporate use are the only Maxtor ATA drives that will continue to ship with a three-year warranty. Those people who want a three-year warranty on a Maxtor drive may be able to purchase an "extended" warranty through the stores that sell the hard drives.

The top three manufacturers of hard drives have reduced the long-standing three-warranty on hard drives to just 12 months.

Western Digital officials also cited cost concerns, but in a different way. Richard Rutledge, a veep of marketing, told the Dog that a huge part of the cost is in administration. Tracking the hard drives' serial numbers as well as production information requires a 6.4 terabyte database. It's an expense that the company can no longer justify. Rutledge said that while the average price of drives have gone down, the profit margins have also gone down, and the reliability and size of the drives have gone up. "It's something we couldn't afford to do anymore," Rutledge said. "We have not changed any of our reliability specs, nor have we changed the quality of the product."

Western Digital has cut the warranty of its standard drives to one year, but power users who opt for the 8MB versions or Special Edition drives will retain the three-year warranty. Western Digital also plans to offer "extended warranties" for those who want them, at a cost of $20.

Seagate also cited the cost of administration as the reason for cutting the warranty. All of Seagate's ATA drives sold after October 1 carry a one-year warranty, and the company is deferring longer warranty periods to the retail outlets.

All three companies maintain that reliability will be the same as before, if not better. Western Digital's Rutledge said, "We have a unique responsibility that, say, the videocard people don't have. Loss to lifestyle because of a videocard failure is significantly different than the loss to lifestyle if your hard drive fails."

But how do retail hard drive warranties stack up against those for other components?

➤Graphics cards: Varies by manufacturer, but ATI offers a three-year warranty on many of its cards, such as the Radeon 9700 Pro.

➤Monitors: Varies, but ViewSonic, for instance, offers a three-year plan on its CRTs.

➤CPUs: Both Intel and AMD warranty retail-boxed CPUs for three years.

➤Motherboards: Varies greatly, but some companies, such as Tyan, offer three-year warranties.

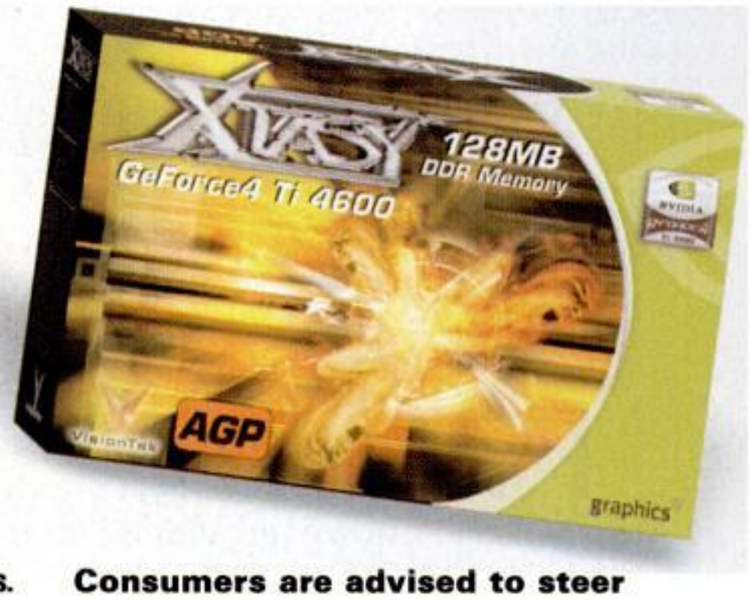
Visiontek Gets Blurry

DEAR DOG: My friend told me that Visiontek went out of business. Is this true? The web site is still working, and it appears to be up to date.

— JOEL BRACHE

THE DOG RESPONDS: The bankruptcy rumors are false, but the situation at the videocard company is indeed grim. Despite its popularity on store shelves, Visiontek is under receivership, and according to a statement that the company released, "An Assignee / Trustee as been appointed, and will attempt to maximize the value of the company's assets. His belief is that the assets have a higher value as a 'turn-key' operation than in a liquidation. The Trustee is continuing to operate the company to determine if a sale is a viable alternative to a liquidation, and he is currently talking to interested parties. The company is continuing to take orders, ship products, and honor rebates."

A spokesman for the company told the Dog that the company hoped to have better news about its fate within a few weeks. There are plans by the assignee to ensure that funds are set aside for tech support



Consumers are advised to steer clear of Visiontek products while the future of the company is sorted out.

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and warranties through the end of 2003, but there are no guarantees. If the entire company is sold to another entity, it's highly likely, but not certain, that the new company will continue to honor warranties.

Fortunately, most of Visiontek's products rely on drivers and firmware from the companies that produced the products' chipsets. The majority of Visiontek's graphics cards use nVidia chips, and drivers continue to be available at www.nvidia.com. Lite-On supplied the drives for Visiontek's foray into the CD-RW business. Until the future of Visiontek is known, the Dog recommends that consumers steer clear of the company's products, as its warranties and tech support may be discontinued.

Fingered by Lynx Touch

DEAR DOG: In January I purchased a 15-inch color touch-screen from Lynx Touch Solutions of New Jersey. The monitor malfunctioned in May. I sent the monitor back to Lynx Touch with an RMA and haven't heard from them since. I e-mailed several times, and called and left messages, to no avail. I'm out $525 and have no other recourse than to have someone intervene to see if something can be done to rectify this problem.

— WILLIAM MALENFANT

THE DOG RESPONDS: Yet more bad news. Lynx Touch Solutions of New Jersey seems to exist solely on the Internet. Phone numbers listed for the company have been disconnected and the company fails to respond to e-mail. A Dun and Bradstreet report on the company says that in January, the credit reporting firm was unable to reach any officers of the small company, but it was operating. D&B says it hasn't had any contact with the company since then. The Dog could not locate any bankruptcy filings for the company, nor any other public records that would indicate the status of the company. The Dog will continue to try to contact company officers, but in the meantime, consumers are warned not to purchase any Lynx Touch equipment until its status is clarified. Woof.

CPUs Slower Than Expected

DEAR DOG: My luck with computers is messed up. I purchased a rugged notebook that was supposed to have an 850MHz Pentium III in it. I had originally ordered an 800MHz P-III, but the company supposedly shipped me an 850 instead. However, when I checked it in DirectX, the CPU was reported as being a Pentium III at 700MHz. The company replaced the laptop with another unit which showed the CPU as an 800MHz P-III when booted. But again, when I checked it with DirectX, the CPU appeared as a 650MHz Pentium III. I took the notebook to CompUSA, and a technician there tested it and found it to be a Celeron III running at 650MHz. I'd like to know if someone could be tinkering with the BIOS, allowing a higher-speed CPU to be reported in the BIOS than what is actually installed?

— LANCE S. UENO

DEAR DOG: I purchased a basic notebook for my wife and the CPU registers as a 600MHz AMD. It should be running at 1.2GHz since it's an AMD 1400+ Athlon. Hewlett-Packard said that it's due to a known glitch in Windows XP Home. The notebook runs fine, but I just want to make sure I'm not getting swindled.

— JESSE SARMIENTO

THE DOG RESPONDS: The Dog initially thought that low-life re-markers had learned a new trick to rip off consumers. (Re-markers take slower CPUs, overclock them, then sell them at the prices of the more expensive and faster CPUs). Fortunately, the trend here doesn't appear to be the work of scammers. Instead it's a trick that the low-voltage mobile chips often play on programs that test a CPU's speed. Some mobile CPUs can slow down to save power. In Lance's case, an incorrect switch in the BIOS disabled SpeedStep, which forced the CPU to run at 650MHz. Once corrected, the CPU reported the correct speed in testing applications. Similarly for Jesse, the Dog suspects that it's simply the PowerNow! technology in the Athlon that's kicking in. Unlike the P-III, mobile Athlon's offer a range of speeds when in power-saving mode.

Mobile chips such as the Pentium III-M can play tricks on programs that are supposed to measure the speed of your CPU.

In general, re-markers keep their dirty scams to desktop CPUs where people are less likely to notice an overclocked CPU because of the additional cooling that can be added to a PC. Notebooks are far more finicky and less likely to work correctly if overclocked. Furthermore, a notebook from a large vendor such as Hewlett-Packard or Dell is devoid of overclocking abilities thus limiting the appeal to re-markers.

Desktop users can verify the authenticity of the chip they've purchased. For Intel users, a program on Intel's web site called *Frequency ID* will quickly tell you if you got what you paid for. For AMD people, it's a little more work, but a visual inspection of your chip's "L" bridges can be enlightening. If they look like they've been tampered with, there's a chance the chip isn't what you paid for. Of course, the Dog doesn't recommend that you go to the trouble of removing your CPU's heatsink to check the bridges unless you have strong suspicions that the CPU's been remarked. If the systems works fine, leave it be. ■

Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic The Dog on them by writing **watchdog@maximumpc.com**. The Dog promises to get to as many letters as possible, but only has four paws to work with.

RECALL ALERT

If you don't get shocked, you might get bumed

Minolta has issued a "product modification notice" for DiMAGE 7i digital cameras purchased during July 2002. A defective main switch in the camera may fail and cause "inconvenience for the user." Minolta asks that consumers return the camera body itself for free replacement. The camera affected is the DiMAGE 7i with serial number ranges of 95217273 through 95219999, and 96201000 through 96226022. Visit www.minolta.com or call 877.462.4464 for more information.

Minolta is asking that consumers send back certain DiMage7i's so that the dial can be repaired.

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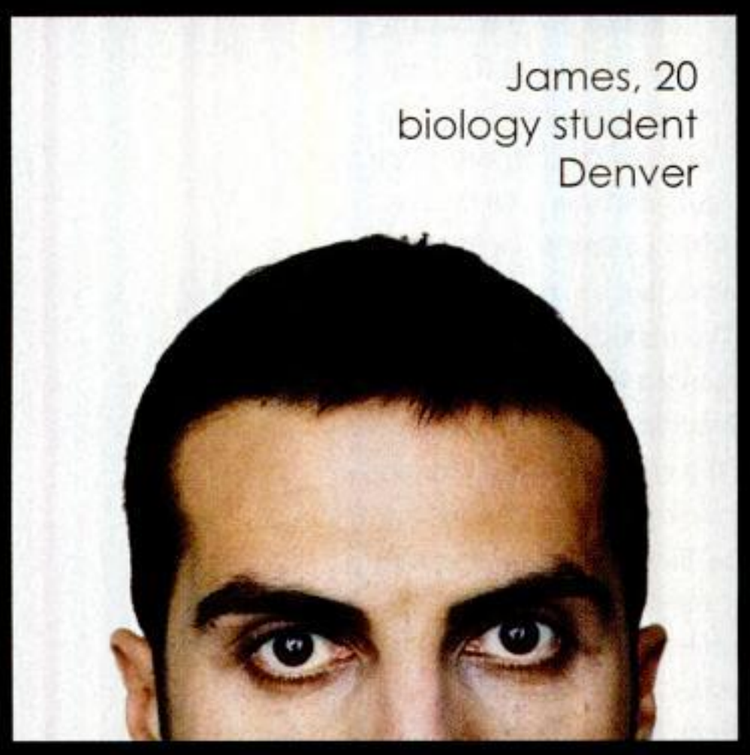
YOU'RE BEING ATTACKED (HALF PIRANHA/HALF

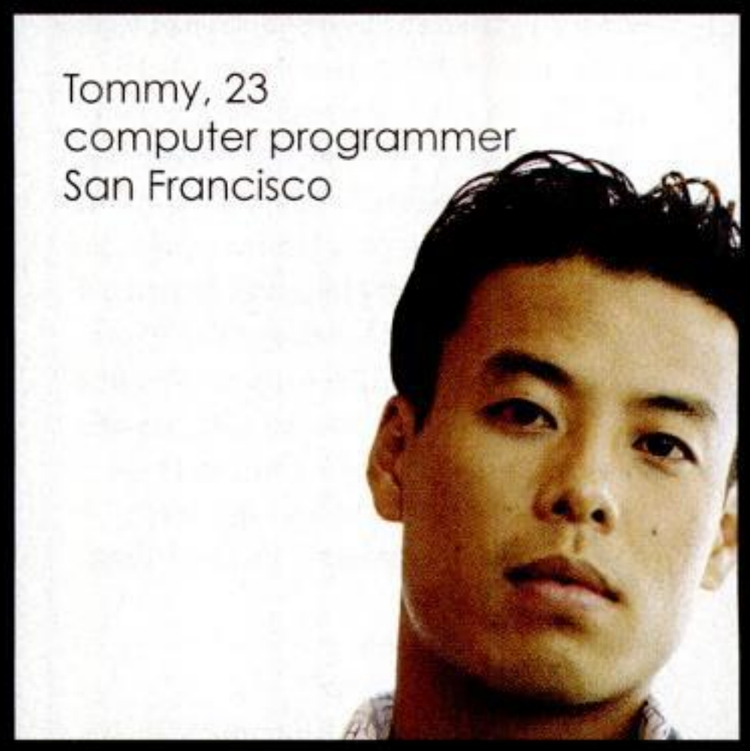


James, 20
biology student
Denver

Jessie the Kid: let's face it. The only good Pirawolf is a dead Pirawolf. 😉

You need to have balance. A good air combat squadron of Vulturesharks, plus a battalion of Hyenadragons, and finally, Turtlelions for the amphibious fights. "Snakes and snails with scorpion tails." These are what real men are made of.

Tommy, 23
computer programmer
San Francisco



TEEN
T
CONTENT RATED BY ESRB

Violence
Comic Mischief

Microsoft game studios

relic ENTERTAINMENT

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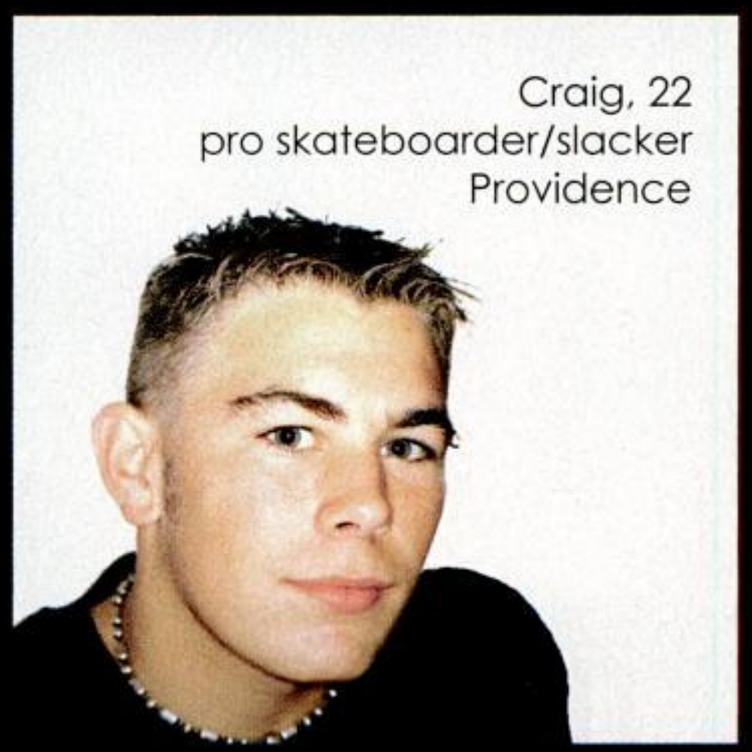
BY AN ARMY OF PIRAWOLVES WOLF).... WHAT WILL YOU DO?

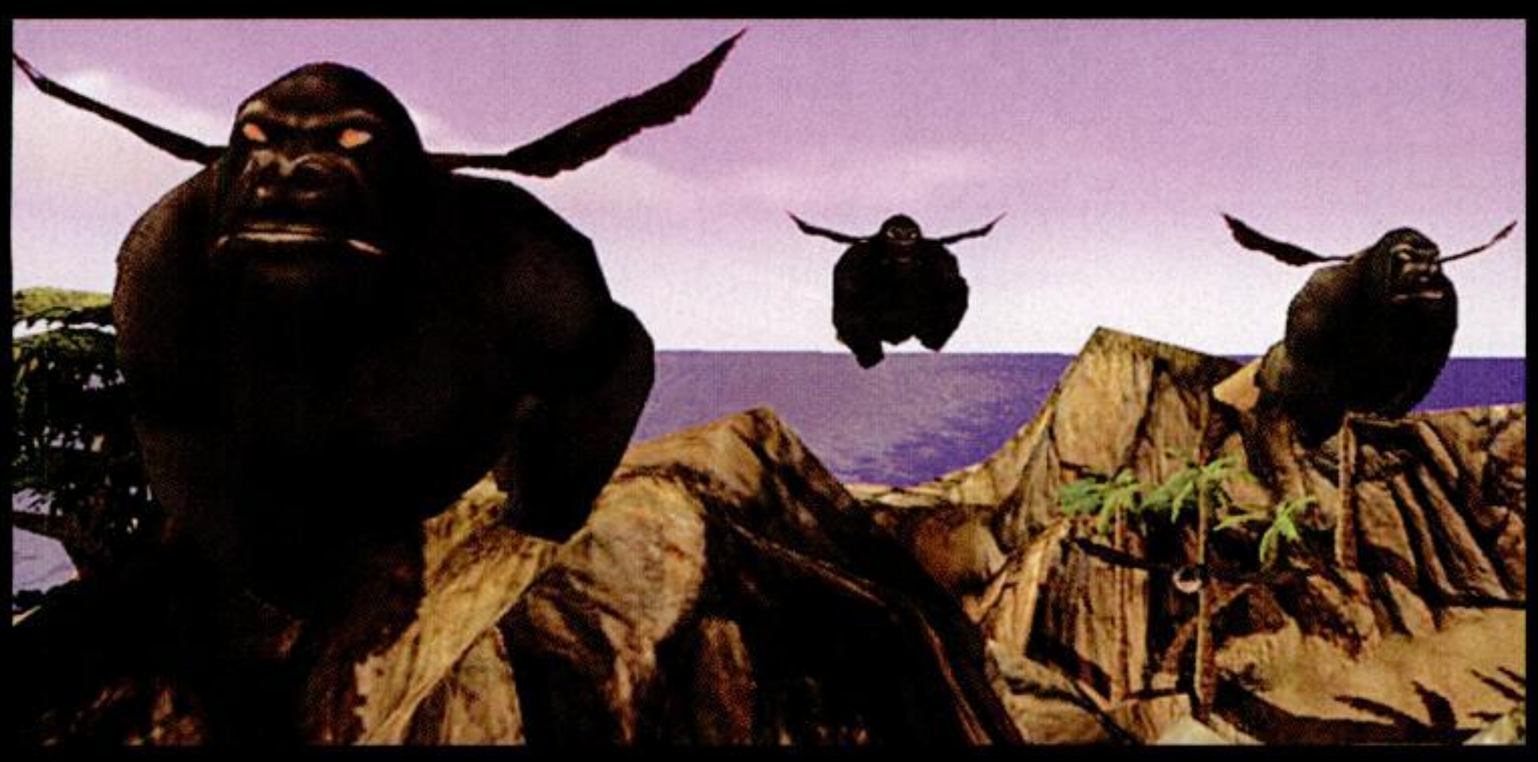
cjm1565: send in my goons. Eagorillas and Rhinobulls.

These boys will punish anything. If the French had them, they wouldn't have needed us in WWII.

END OF STORY, BIZATCH!



Craig, 22
pro skateboarder/slacker
Providence



Tom Tom: let's just say,

MAJOR PAIN IN THE...;)

A Tigebra is pretty wicked, or a Tiganzee. Haven't tried a tiger and a rhino yet.

My bet is it terminates with extreme prejudice. I like that.

IMPOSSIBLE CREATURES™

A DIFFERENT KIND OF ANIMAL

Coming January 2003

Welcome to Impossible Creatures, the next real-time strategy game from the makers of Homeworld®. Get ready for a world where you create completely whacked-out mutant animals and then unleash them on your enemies. Fast-paced RTS action and dynamic 3D environments combined with over 40,000 possible animal creations equal combat like you've never seen. And with intense online multiplayer action, your opponents are as limitless as the creatures you create.

www.microsoft.com/games/impossiblecreatures

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GEAR OF THE YEAR 2002

The dust has settled. The votes are in. Maximum PC proudly presents the finest PC hardware of the past 12 months

It's been an astounding year. Processors have topped 3GHz, videocards have become almost CPU-like in their programmability, and LCDs have gotten bigger, brighter, and cheaper. Are we impressed? Yes, indeed. Are we satisfied? Hell, no! Because for every world-class product we tested, there was another product that proved to be "just second best." That's where this awards presentation comes in. On the following pages we separate the near-great from the truly exceptional. Twenty-five categories, 25 winners. No second- or third-place choices. This is it, readers—GOTY 2002. The list you've been anticipating for the last 12 months.

Although not every GOTY product has been officially critiqued in the magazine's reviews section, all of our choices are based on extensive testing, prodding, and poking. As for the products that have received official review verdicts, please note that we've taken their original Lab performances into account, but have also factored in continuous torture testing in the field. The bottom line: Every winner dramatically improved our basic PC experience. We'd welcome the lot of them into our homes and would recommend any of the 25 without hesitation.

Without further ado, we present Gear of the Year 2002.

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DVD RECORDER

Sony DRU-500A

Everyone wants a DVD recorder that's not only fast, but also compatible with set-top DVD players. But which standard is going to get along better with your player, DVD-R/W or DVD+R/W? And what happens if the standard you choose turns out to be the big loser in the format wars? Worry no more. Sony's DRU-500A packs both technologies into its combo DVD writer and CD burner. The DRU-500A not only supports both -R/W and +R/W, but at 4x writing to DVD-R, it actually writes faster than Pioneer's own DVR-A04—and Pioneer created the -R format!

You don't just get format insurance with this drive, however. The DRU-500A also writes to CD-R at 24x, rips at slightly more than 30x, and comes in a fetching case. For writing to recordable DVD discs, this drive is the end-all, be-all.

$350, www.sonystyle.com (receives a 10 verdict and Kick Ass award in this issue)

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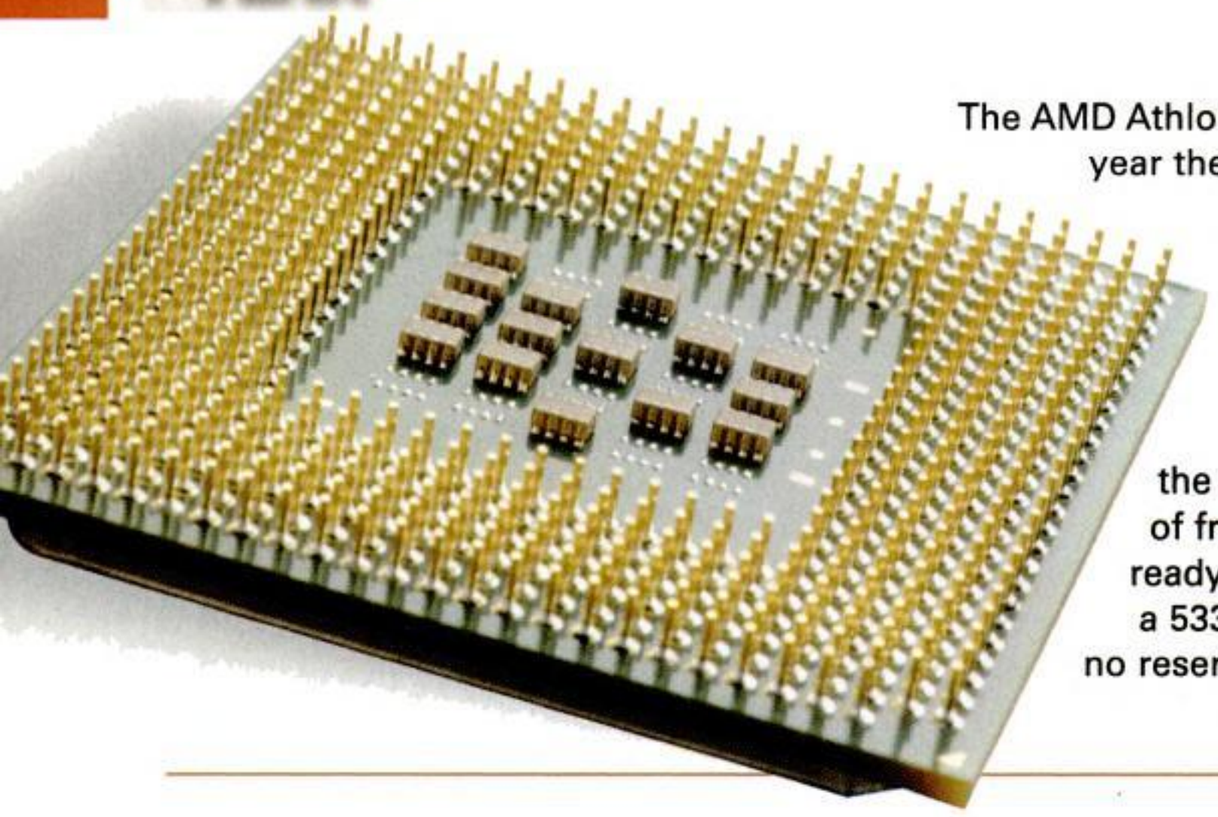
GEAR OF THE YEAR

CPU

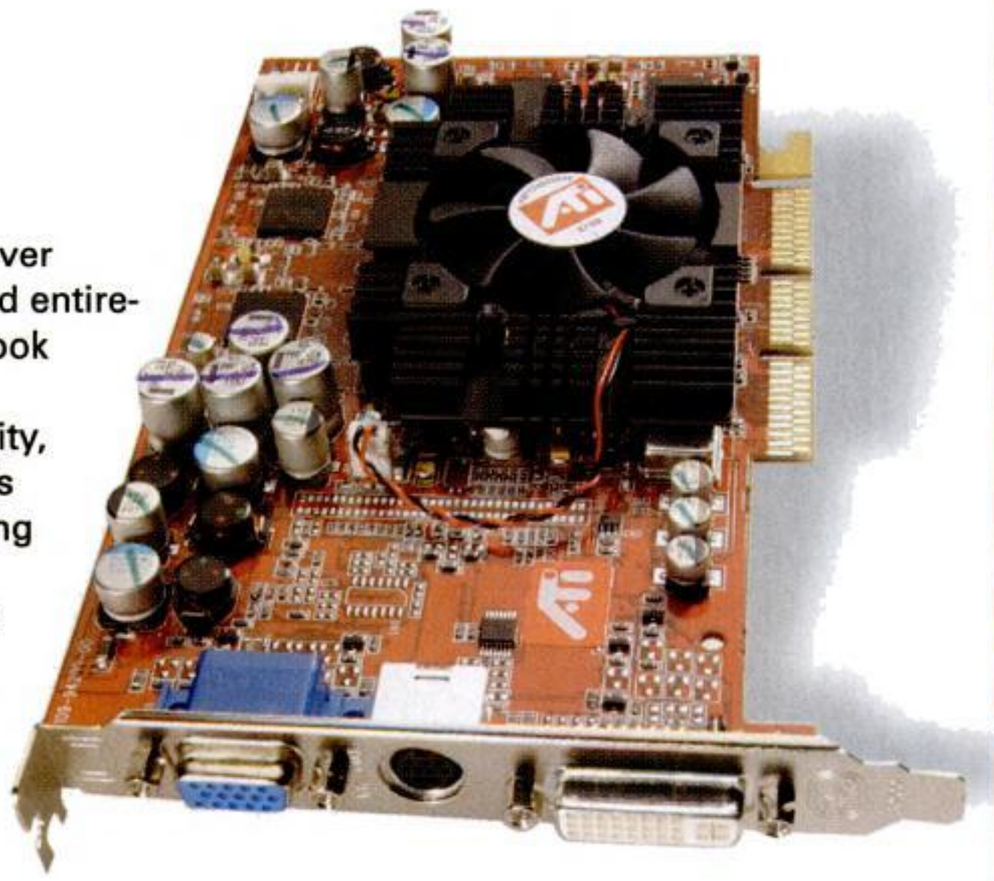
Northwood Pentium 4



The AMD Athlon has won this contest three years in a row, but this year there's no denying Intel's performance dominance. The key to Intel's success is sheer, unadulterated horsepower, and with a frequency advantage in excess of 500MHz, the 0.13-micron Northwood Pentium 4 has opened up a two-liter bottle of kick-ass on AMD's Athlon XP. Intel has increased speeds from 2GHz to 2.8GHz in a span of just eight months, and the Northwood P4 doesn't look like it's going to run out of frequency headroom anytime soon (3GHz is basically ready to go whenever Intel wants to flip a switch). Add in a 533MHz system bus and PC1066 RDRAM, and we have no reservations crowning the P4 as the new processor king.
www.intel.com (last Lab-tested in November 2002)

3D ACCELERATOR

ATI Radeon 9700 Pro



When ATI released the Radeon 9700 Pro, it didn't just leapfrog over nVidia's GeForce4 Ti 4600—it hopped into a different playing field entirely. Sure, the Ti 4600 is fast, but the 9700 makes the nVidia part look like it's running everything in Bullet Time. The benchmarks tell the whole story: With anti-aliasing enabled for better visual quality, a stock-clocked Radeon 9700 hit 10,985 in *3DMark 2001 SE*. That's about 800 marks better than what the Ti 4600 hit with anti-aliasing disabled! And when both cards are running with AA off, the Radeon 9700 is almost *twice* the speed of the Ti 4600 in *3DMark 2001's* programmable shader test! The 9700 is overclocking-friendly to boot. All in all, the latest ATI part is one of those precious few products that leave us slack-jawed.
$375, www.ati.com (received a 10 verdict and Kick Ass award in October 2002)

Most oversold launch: The Matrox Parhelia promised great things, like 16x fragment anti-aliasing and DirectX 9 vertex shader support, but ultimately couldn't deliver competitive clock speeds. Oh well, at least Matrox released something. We're still waiting for a Creative Labs consumer videocard.

MONITOR

Sharp L1820

Sony's 21-inch, flat-screen F520 is the best CRT monitor available today. But it also hasn't changed much in the last 12 to 24 months. So our GOTY award for best monitor goes to a piece of technical innovation that's rewritten the LCD rule book. Simply put, the Sharp L1820 reproduces more colors than any other consumer LCD ever created. Its 10-bit gamma correction can output 1,024 graytones per pixel, whereas all competing LCDs muster just 256 graytones per pixel (if that). And more graytones provide greater color control, which in turn grants the precision tuning required by imaging professionals. Do all hardcore home enthusiasts need this space-age hoo-ha? No. But the L1820 is priced competitively, and looks absolutely sublime for regular desktop work, so why not buy the best?
$1,300, www.sharp-business.com (received a 10 verdict and Kick Ass award in the August 2002 issue)

OVERCLOCKING ACCESSORY

Innovatec Watercooling Kit

Innovatech's wetworks will squelch your PC's heat better than the biggest air-pushers—and the entire cooling system barely gets louder than a whisper. The kit's hefty waterblocks attach to your CPU, hard drive, and graphics processor, wicking away heat and dispersing it in an aluminum and copper radiator. All to the tune of 158 gallons of water per hour. Is putting water in your case dangerous? Possibly. But this kit's PVC tubing is locked down with O-rings and steel fittings, making mishaps highly unlikely. Besides, living on the edge is half the fun!
$350, as tested with Tank-O-Matic reservoir and GPU block, www.highspeedpc.com (not previously reviewed)

Dissenting opinion: If watercooling is too freaky for you, check out Alpha's PAL 8942T cooler ($35, **www.micforg.co.jp**). It mounts directly to the motherboard, and paired with a Vantec Tornado **($18, www.vantecusa.com**), you've got the best air-cooling solution bar none.

ATHLON CORE-LOGIC

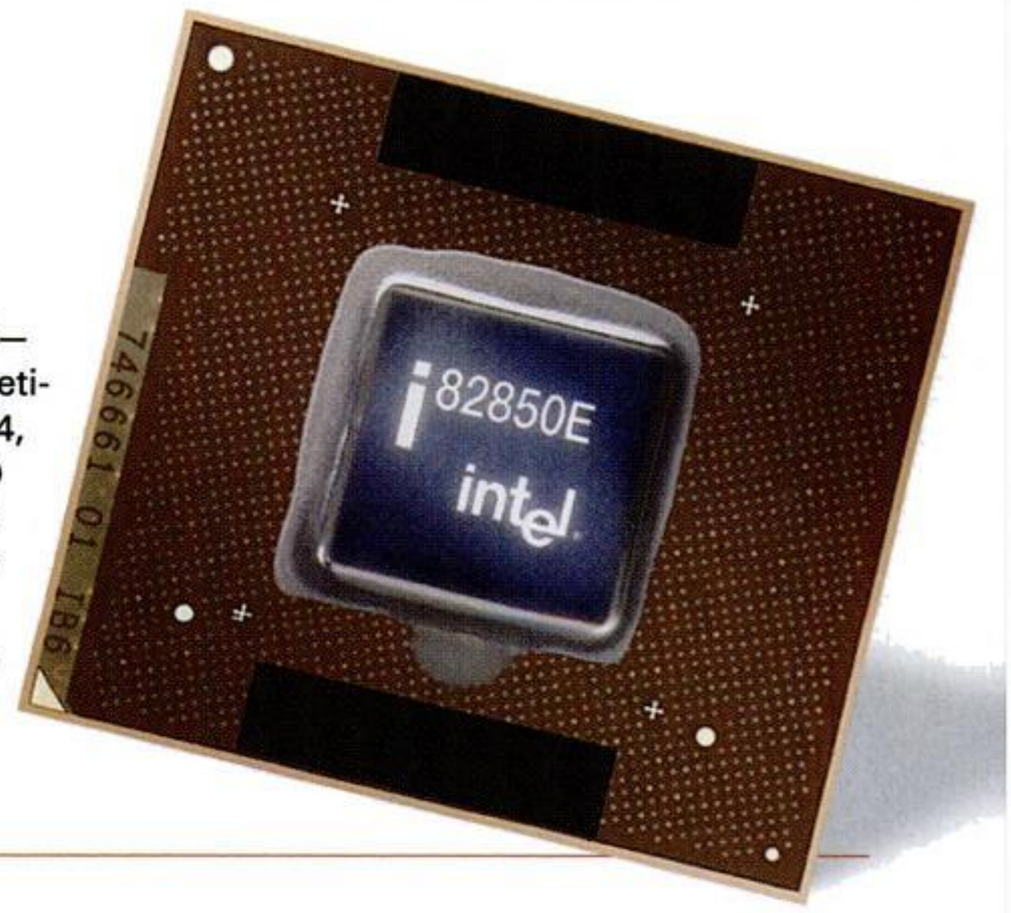
VIA KT400

The jump to a 333MHz system bus (166MHz double-pumped) has given new life to the Athlon XP platform. And if you're running either a 2700+ or 2800+ CPU, the new system bus isn't just preferred, it's a necessity. Interested? Then your de facto chipset is VIA's KT400, the only game in town for AMD's two fastest Athlon XPs. No need to feel handcuffed, however, because the KT400 (and, from what hear, the soon-to-be-announced KT400A) gives you support for AGP 8x, DDR400, and native USB 2.0 in addition to the faster bus speed. We expected some competition from nVidia's nForce2 chipset, but at press time nForce2 boards were still rather vaporish. VIA's KT400 is the highest-performing, most feature-rich Athlon chipset available—that much, you can bet on.
www.viatech.com (not previously reviewed)

On second thought: If you're still fuming over your KX133, and just don't trust VIA chipsets, you may want to wait for nForce2. Some OEMs we've talked to say nVidia's late-to-the-party chipset is well worth the wait

P4 CORE-LOGIC

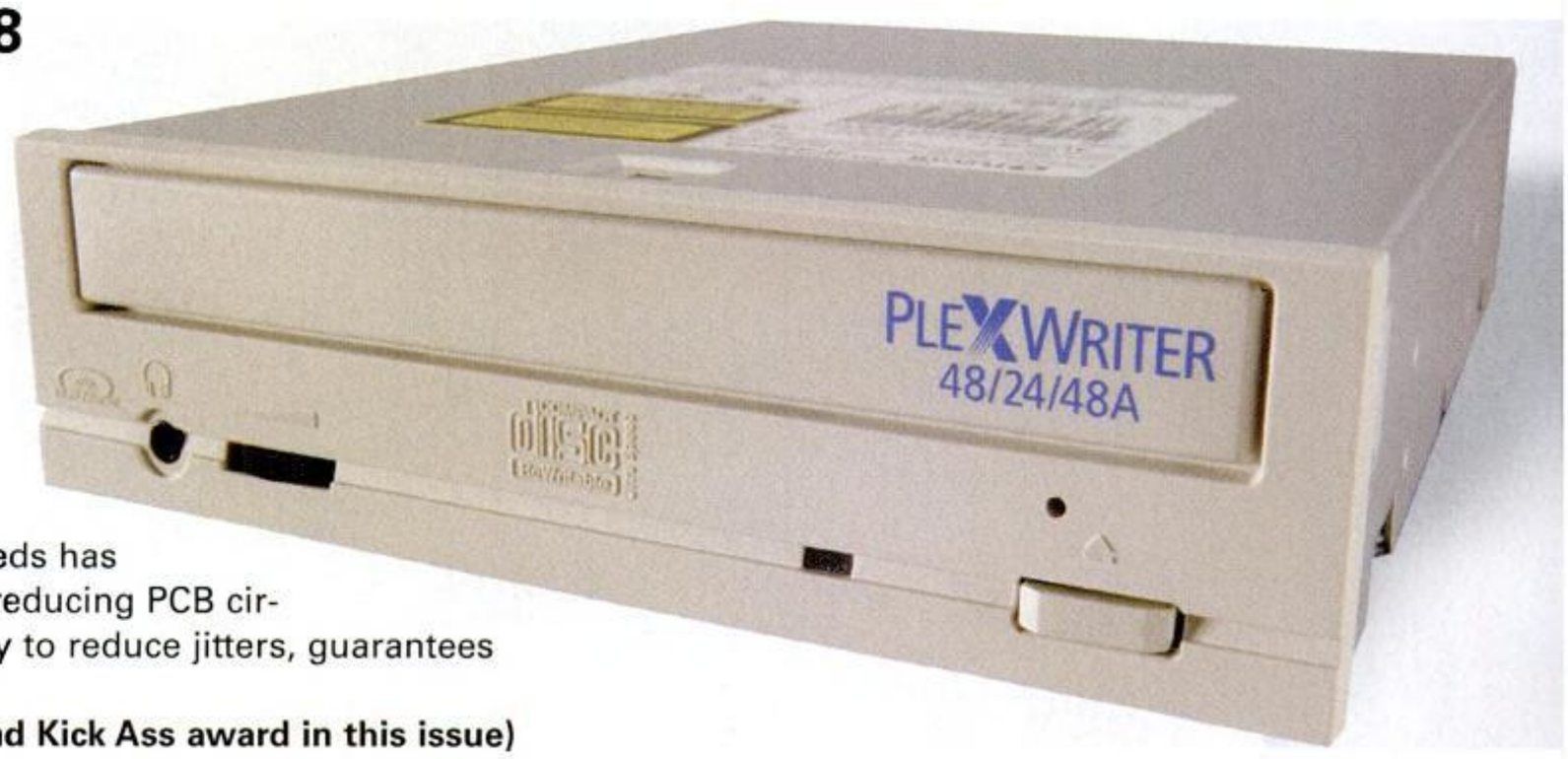
Intel 850e



Intel's 850e chipset adds support for a 533MHz frontside bus and PC1066 RDRAM—and it's this potent combination that gives the P4 the wings to fly above its competitors. When we did a recent shootout between the Athlon 2800+ and the 2.8GHz P4, AMD encouraged us to use DDR memory for both platforms. That's because AMD knows Intel's RDRAM chipset is much faster than any single-channel DDR chipset that's currently available for the P4. Will the 850e and 1066GHz RDRAM hold their own against upcoming dual-channel DDR chipsets, or even SiS's upcoming RDRAM chipset? It's not yet clear. But for now, if you care about P4 performance, RDRAM with the 850e chipset is the only way to go.
www.intel.com (not previously reviewed)

CD-RW DRIVE

Plextor PlexWriter 48/24/48



Call it the return of the Sexy Plexy. Plextor's conservative, reliability-first approach combined with a bug in Roxio's *Easy CD Creator* software kept burn speeds behind the pack through most of the year. But the company has come back in a *big* way with the PlexWriter 48/24/48. The software has been fixed, allowing the PlexWriter to achieve record-breaking recording times. In fact, CD-RW speed has *doubled* to a 24x maximum. And the ceiling for digital audio extraction speeds has been raised to 40x. This, combined with noise-reducing PCB circuits near the power supply and a black CD tray to reduce jitters, guarantees you the best audio rips this side of the RIAA.
$160, www.plextor.com (receives a 9 verdict and Kick Ass award in this issue)

And by the way: If MP3 collecting is your primary pastime, pair up the PlexWriter with *Exact Audio Copy* (**www.exactaudiocopy.de**) for ripping, and the *LAME* encoder (**www.hot.ee/smpman/mp3**) for MP3 encoding.

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Music or video. Photos or data. Satisfy your creative urges
with our discs, burners, players and accessories.

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indulge your creative spirits.

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INTERNAL HARD DRIVE

Western Digital WD 1200JB

Based on this year's de facto specs for high-performance IDE drives—7200rpm and 40GB per platter areal density—Western Digital's 120GB WD1200JB throws in an 8MB buffer for good measure. Typically found only in high-end server or workstation drives, the larger buffer isn't just a gimmick. It anticipates what data your apps are likely to request before they ask for it (creepy, but effective). Who could have predicted that the 14-month-old Western Digital JB formula would *still* be beating the latest competition today? **$220, www.wdc.com (the 100GB WD1000JB received a 10 verdict and Kick Ass award in March 2002)**

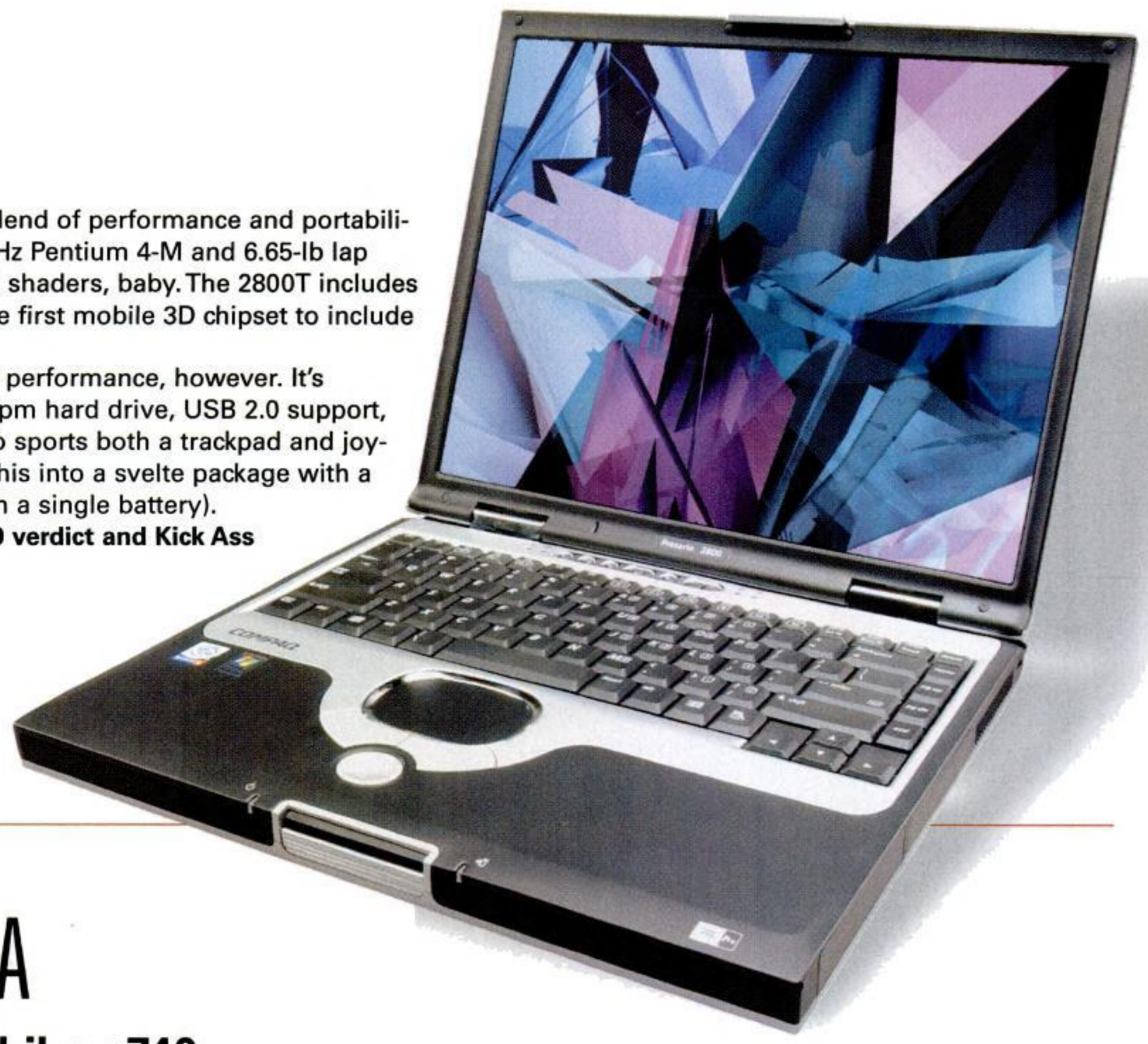
Dissenting opinion: The fastest hard drive in the universe? It's the third-generation Cheetah 15K.3. With platters whirling at 15,000rpm, the Cheetah boasts access times about 400 percent faster than those of the fastest IDE drives, and transfer rates close to 80MB/sec. It's ludicrously fast, and ludicrously expensive, but wholly appropriate for server farms **($940 for 73GB, www.seagate.com)**.

NOTEBOOK

Compaq 2800T

Compaq's 2800T gives you a sublime blend of performance and portability—for this you can thank the unit's 2GHz Pentium 4-M and 6.65-lb lap weight. But it's really all about the pixel shaders, baby. The 2800T includes ATI's Mobility Radeon 9000, which is the first mobile 3D chipset to include support for programmable shaders.

The Compaq isn't just about gaming performance, however. It's decked out with a spacious 60GB 5400rpm hard drive, USB 2.0 support, and a 1600x1200 screen. The 2800T also sports both a trackpad and joystick mouse. And best of all, it gets all this into a svelte package with a fair battery life (more than two hours on a single battery).
$3,060, www.compaq.com (received a 9 verdict and Kick Ass award in November 2002)



PDA

Toshiba e740

The new ARM-based Palms look promising, but even dyed-in-the-wool Palm loyalists can't help but drool when they see the Toshiba e740 access a LAN through the built-in Wi-Fi, or play MP3 files off a 1GB MicroDrive slapped into the available CompactFlash slot. The e740 seems to have about every interface or goodie available, save a Bluetooth connection. Oh wait, that can run in the unit's SDIO (Secure Digital) slot if need be. All this plus a 400MHz CPU, ATI graphics, and a user-replaceable battery make the Toshiba e740 our number one pick for PDA this year.
$600, www.toshiba.com (received a 9 verdict and Kick Ass award in November 2002)

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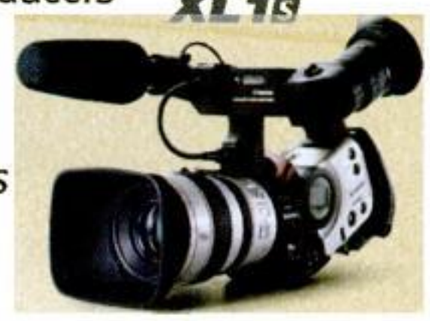
Canon Mini DV. When making movies is your life. Or when making a movie of your life.

Consider the professional movie director (who has a bunch of hot-shot producers breathing down his neck). Lucky for him, Canon's XL1S has revolutionized digital video with a fully customizable *Open Architecture* that accepts an enormous range of *lenses and viewfinders*. What's more, our GL2 has a *Fluorite lens with 20x Optical Zoom* that takes shots you wouldn't try up close (no matter how passionate you are). Both feature *3 CCDs with Pixel Shift* and Canon's superb *Optical Image Stabilizer™* for utmost clarity. **Inside every moviemaker there's a photographer waiting to get out.** Our Optura 200MC and Elura 40MC are not only the envy of other camcorders, they're exceptional digital cameras too. The Optura 200MC's *Digital Photo Mode* captures and stores *1.33 megapixel photos*. And both print them in full color directly from our Card Photo Printers without connecting to your computer. **Just show me where to point.** If you insist on being your own director, better use the ZR50MC. *8 Program Auto Exposure Modes* adjust to any shooting condition. Better yet, select the *Easy Mode* and the camera adjusts itself. **Everyone's passionate about Canon.** Movies. Memories. Tinseltown. Your town. Canon Mini DV camcorders make memorable movies and moving memories. www.canondv.com **1-800-OK-CANON**

XL1S



GL2

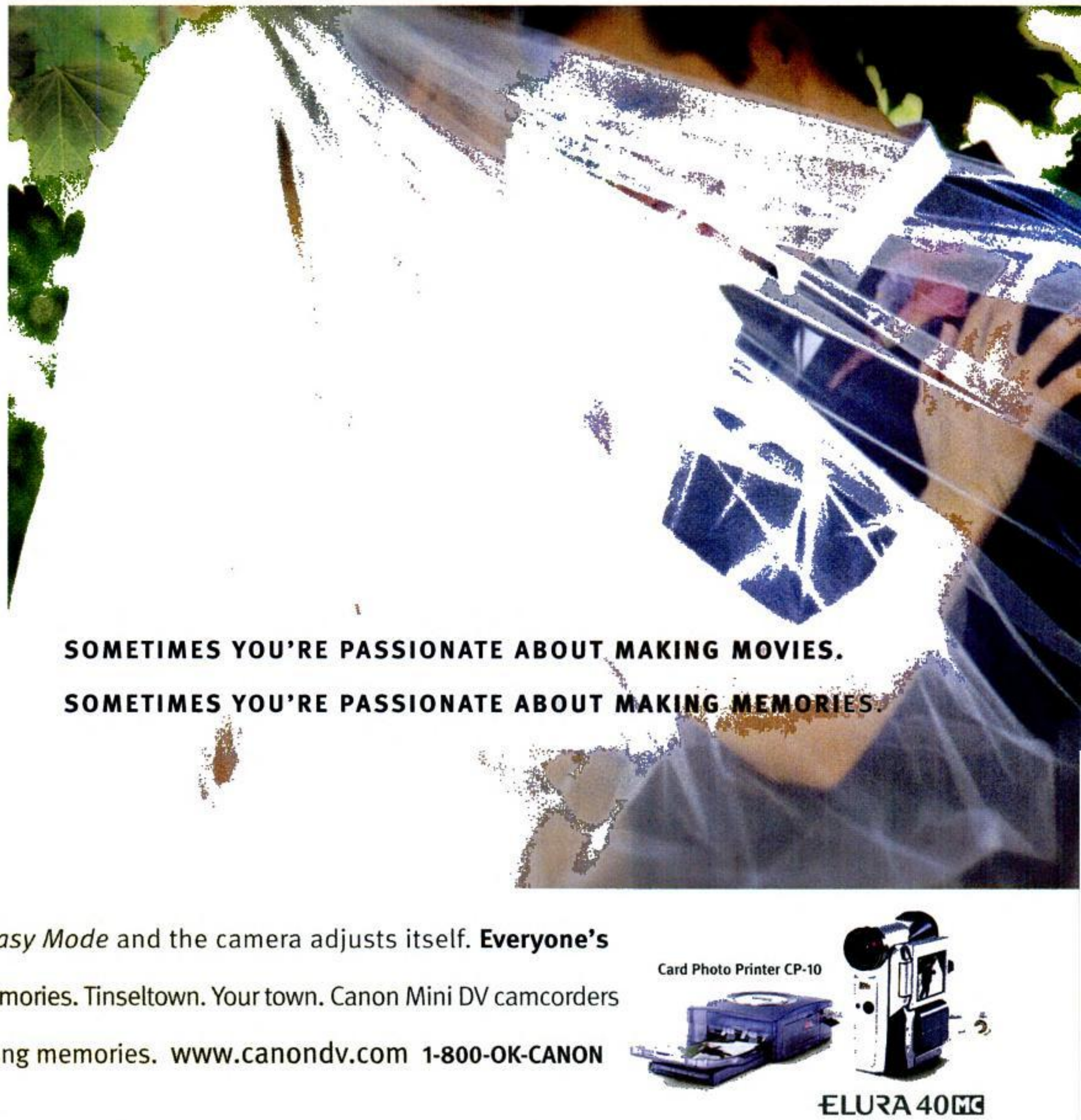
Designed for Microsoft® Windows® XP

Mac

canon connects

Mini DV

DV Messenger



SOMETIMES YOU'RE PASSIONATE ABOUT MAKING MOVIES.

SOMETIMES YOU'RE PASSIONATE ABOUT MAKING MEMORIES.

Card Photo Printer CP-100

optura 200MC

ZR50MC

Card Photo Printer CP-10

ELURA 40MC

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Canon KNOW HOW™

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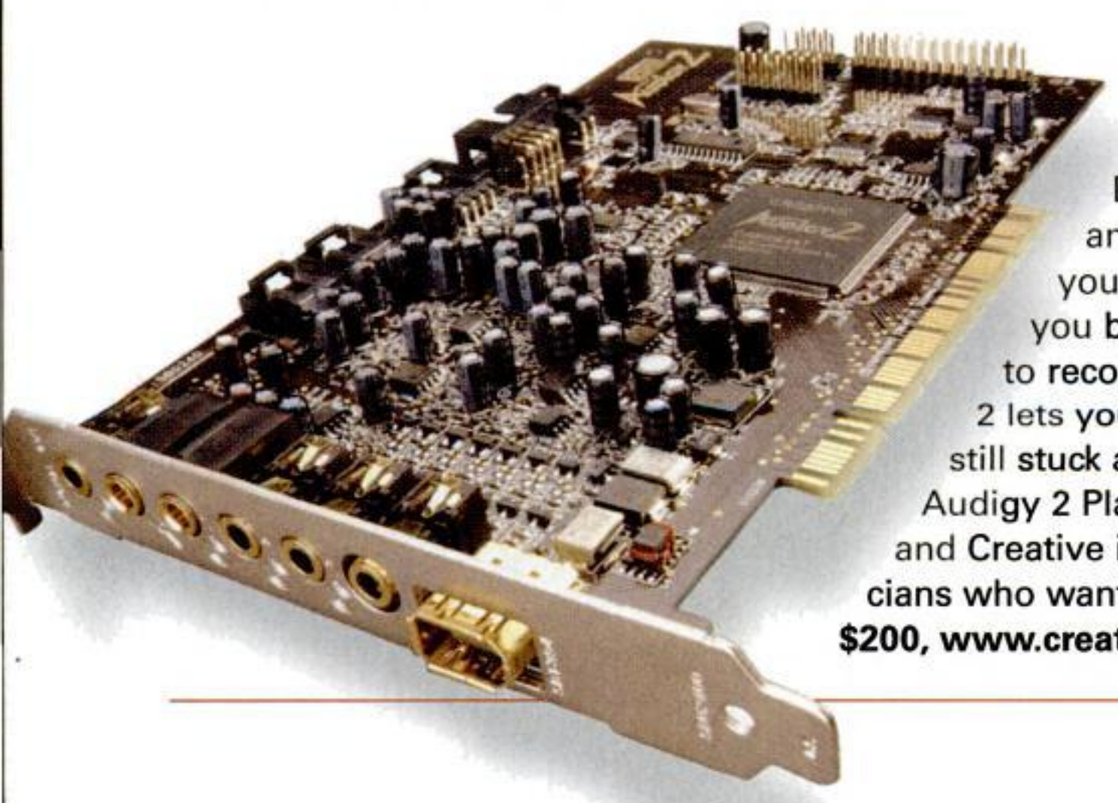
CASE

Coolermaster ATC-110

In much the same way a titanium-alloy fighter jet was crafted to break the sound barrier without flinching, the all-aluminum Coolermaster exoskeleton was conceived to cradle PC components pushing the GHz barriers—all without frying from the inside out. Giving Coolermaster back-to-back GOTY awards for best case design, the ATC-110 trumps last year's winner by adding a top blowhole, dual intake fans that blow filtered air across seven 3.5-inch bays, and four 5.25-inch bays concealed behind a solid aluminum door. The ATC-110's clean lines and tough construction are exhibited inside and out. Perfect for not only the extreme overclocker in your house, but also the fussy interior decorator.
$300, www.coolermaster.com (not previously reviewed, but used in our September 2002 Dream Machine)

SOUNDCARD

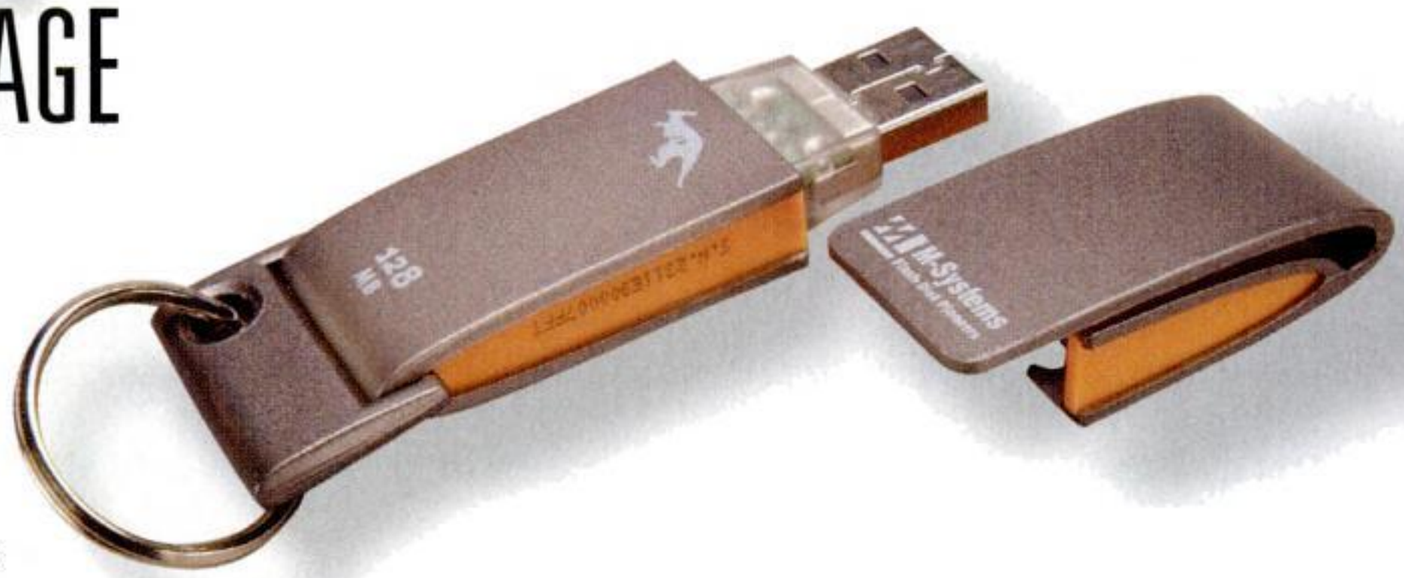
Creative Labs Sound Blaster Audigy 2 Platinum



It's been a sleepy year for soundcards, but right before press time, Creative Labs busted out an update to its vaunted Audigy line. Take the original Audigy and add DVD-Audio, Dolby Digital EX support, THX certification, and improved drivers and applets. Put it all together and you have our pick for soundcard of the year. Oh yeah, and if you bitched to high-heaven about the original Audigy's inability to record at 24/96KHz, you'll be pleased to know that the Audigy 2 lets you record in glorious, hi-res 24-bit. (Caveat: Recording is still stuck at 16-bit if you're using the low-latency ASIO drivers.) The Audigy 2 Platinum uses a similar Live! Drive as the original Audigy, and Creative is tooling up on a new external version aimed at musicians who want to take advantage of the low-cost 24-bit recording.
$200, www.creative.com (not previously reviewed)

PORTABLE STORAGE

DiskOnKey Pro



Ciao, floppy. See ya, CD-RW. It's like this: Once you start using a USB-based flash memory key to store files and transfer them from one PC to another, you can't do without one ever again. M-Systems introduced not only the first driverless chip-on-a-stick to us, but also the fastest and most sophisticated, with a 32-bit ARM processor and onboard USB controller. And now the best just got better. The DiskOnKey Pro, with capacities up to 512MB, is much slimmer and smaller than its predecessor, and according to our tests, capable of a 30 percent faster transfer rate. Speedy, convenient, and dare we say it, even cute, a DiskOnKey Pro ought to be in every geek's pocket.
$150, www.diskonkey.com (Pro version not previously reviewed)

MODDING ACCESSORY

Dremel MultiPro 395T6 Kit with Flex-Shaft

It slices! It dices! Dremel's MultiPro tools are the Ginsu knives of the case modder elite. There's nothing like carving through an aluminum case door at 35,000rpm (the highest of the tool's variable speeds) to make one feel like an übergeek. This year's top Dremel comes with all the requisite bits and bobbles for polishing, sanding, grinding, cutting, cleaning, and brushing. There's even a handy flex shaft to manage those tight corners. Giving new meaning to the phrase "hacking your PC," every serious case modder must have one.
$80, www.dremel.com (not previously reviewed)

The worst modding accessory of the year: The aptly named "Nibbler" claims to make slicing through your case walls quick and easy. But with a tiny 5mm bite, you better have a small case made of cardboard. Rust will break down your steel case faster **($8, www.cyberguys.com)**.

READER RIG OF THE YEAR

The Hellraiser Puzzle Box

It's the G4 Cube's evil twin. The anti-Mac. *Darth PC.* It's the Reader Rig of the Year. Created by Sheffield Abella and featured in our September 2002 issue, the cube beautifully mimics the sinister Puzzle Box from the *Hellraiser* movies (or, if you prefer, just the *good* one). It's a mere 10 inches long on each side, and constructed of six custom-cut acrylic panels bonded together with L-connectors. The Puzzle Box wasn't intended to hold the souls of villainous freaks, but instead a 1GHz P-III, 512MB of RAM, a Shuttle FV24 Flex ATX mobo, a 40GB Western Digital hard drive, and a 24x CD burner. And instead of the screaming of the tormented and otherwise damned, the sounds most likely to come from Sheff's box are those of his MP3s.

But, hey, just like Pinhead chimed in *Hellraiser,* "The box. You opened it. We came."

WILDCARD

Shuttle SS51

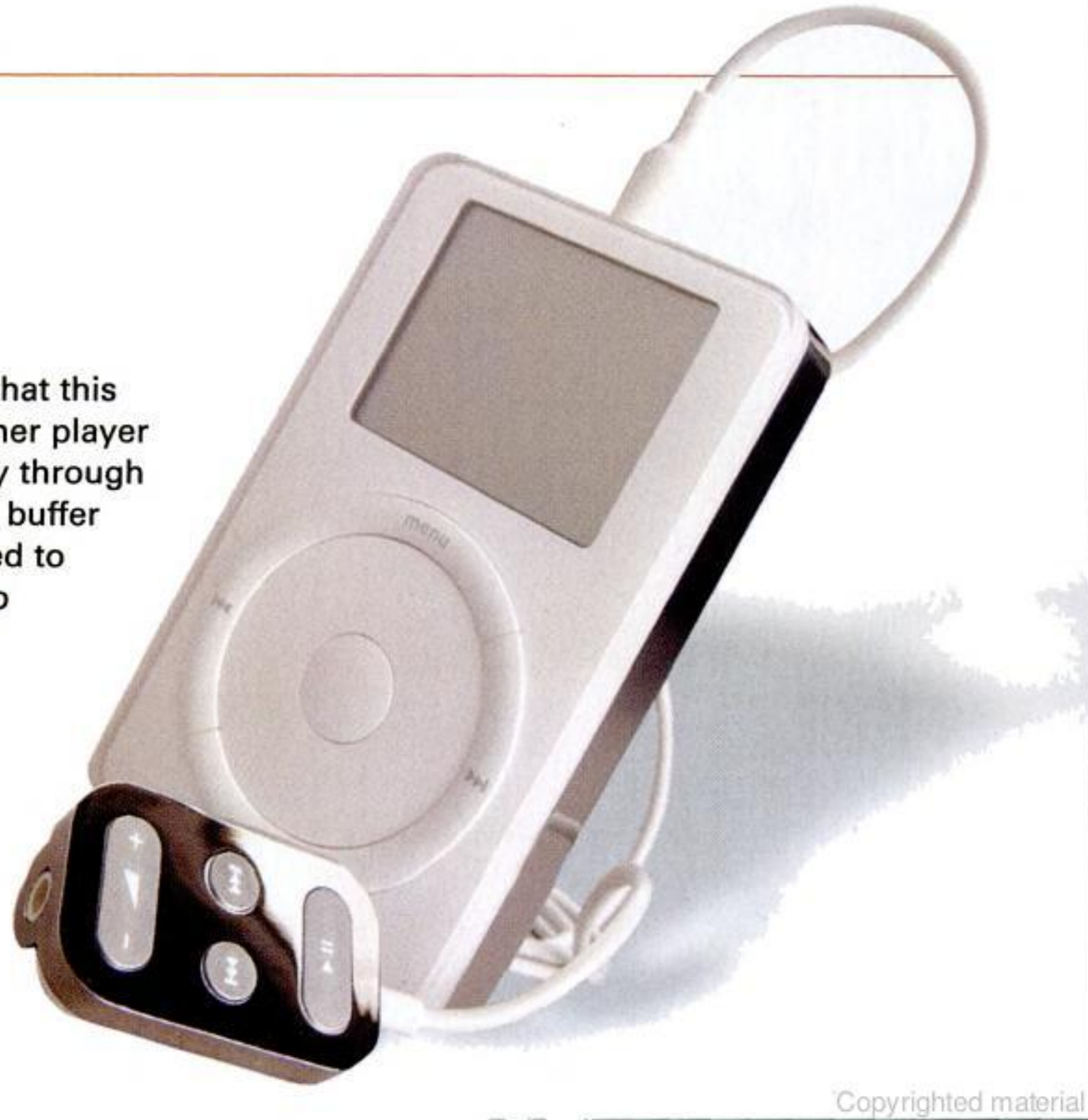
Not all products fit neatly into a single, specific category. So we created a new one for all the orphans, hybrids, and hardware freaks that win our hearts throughout the year. And this year, there's no better example than the Shuttle SS51. Is it a case? Is it a mini-PC? Is it a bare-bones system? Is it a PC in Mac-drag?

Well, it's a little of all those things, and a whole lot more. In a feat of ingenious PC origami, the Shuttle Group managed to make enough space in its tiny cube for a 4x AGP slot, onboard USB 2.0, and a 533MHz bus. Want a portable LAN party cube? Throw in your Radeon 9700! Need a home entertainment center? Add a DVD-ROM and wire it up with 5.1s. Plus, the Shuttle is stackable, if you're into that Swedish furniture aesthetic.

$360, www.shuttlegroup.com (received a 9 verdict and Kick Ass award in October 2002)

MP3 PLAYER

Apple iPod



Enough already—we all know it's pretty. But what's more important is that this 20GB MP3 player works better, faster, and more intuitively than any other player of its kind. It charges the lightweight, malleable lithium-polymer battery through its FireWire cable even when you're transferring music. There's a 32MB buffer to guard against skips. And it gets *loud as hell.* We would have preferred to give the award to a more, uh, PC-centric manufacturer, but we've got to hand this one to Apple. It hurts. You might say it *mega*-hurts.

$500, www.ipod.com (received a 9 verdict and Kick Ass award in November, 2002)

Dissenting opinion: If its features you want, then grab Creative Labs' Nomad Jukebox 3 ($400, **www.nomadworld.com**). You can pack an extra lithium-ion battery in the spare bay for more playtime, it has a dedicated line-out, and offers both FireWire and USB 1.1 connections!

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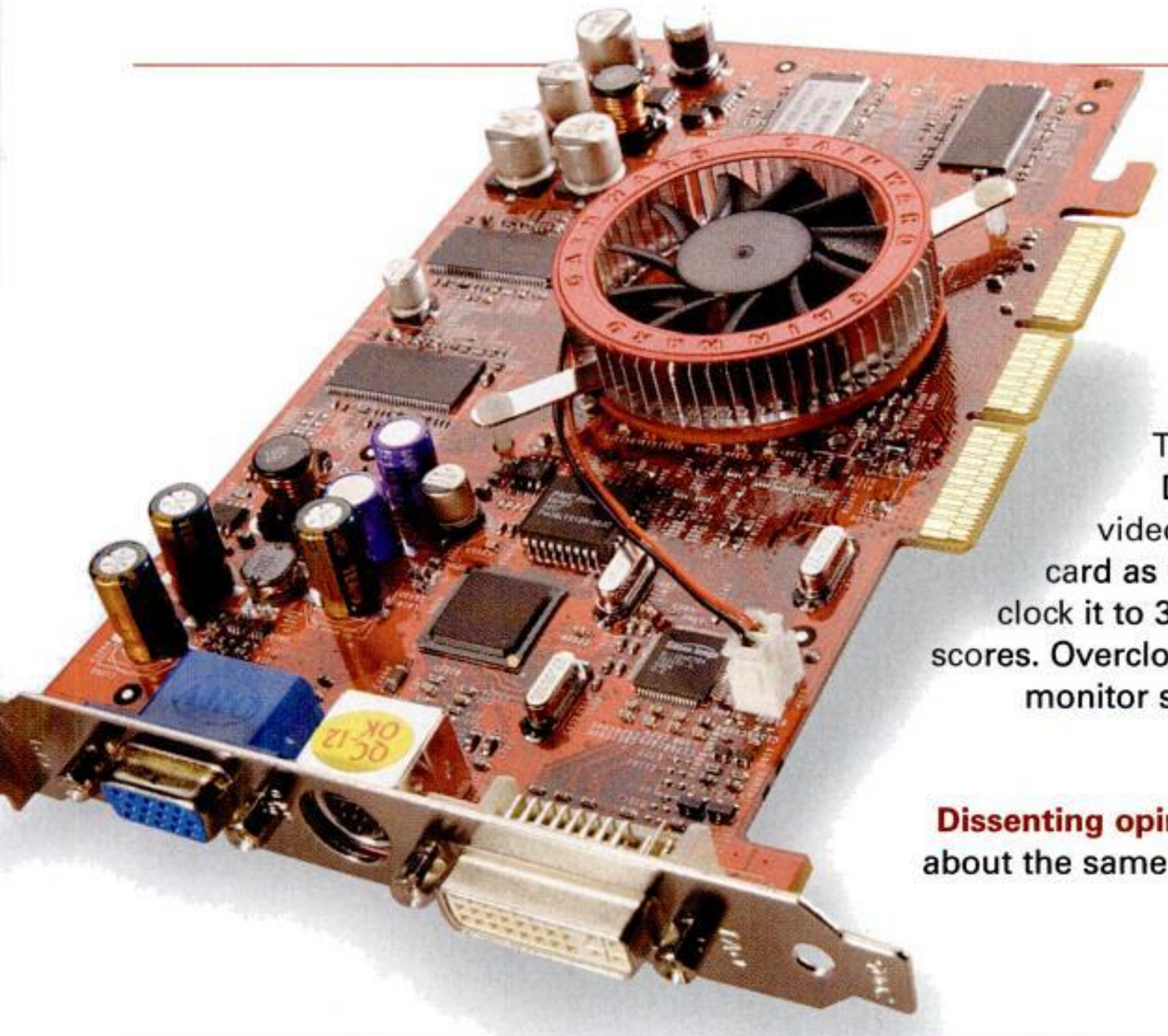
DIGITAL CAMERA

Canon Powershot S40

Kiss your visits to Walmart photo processing center goodbye. The Canon Powershot S40 is small enough and sharp enough to compel you to finally ditch your film-based point-and-shoot forever. A 4-megapixel CCD peeks through the Canon 3x optical zoom for razor-sharp pictures as big as 2272x1704. Ansel Adams wannabes can fully control exposure and focus through manual modes, while the automatic modes work just fine for clueless types. Pack all of this pixel-pimping power into a sleek aluminum case the size of a thick bar of soap, and you've got the smallest 4-megapixel camera around, and our digital camera of the year.

$800, www.powershot.com (not previously reviewed)



BUDGET VIDEOCARD

Gainward GeForce4 PowerPack! Ultra/650XP Golden Sample

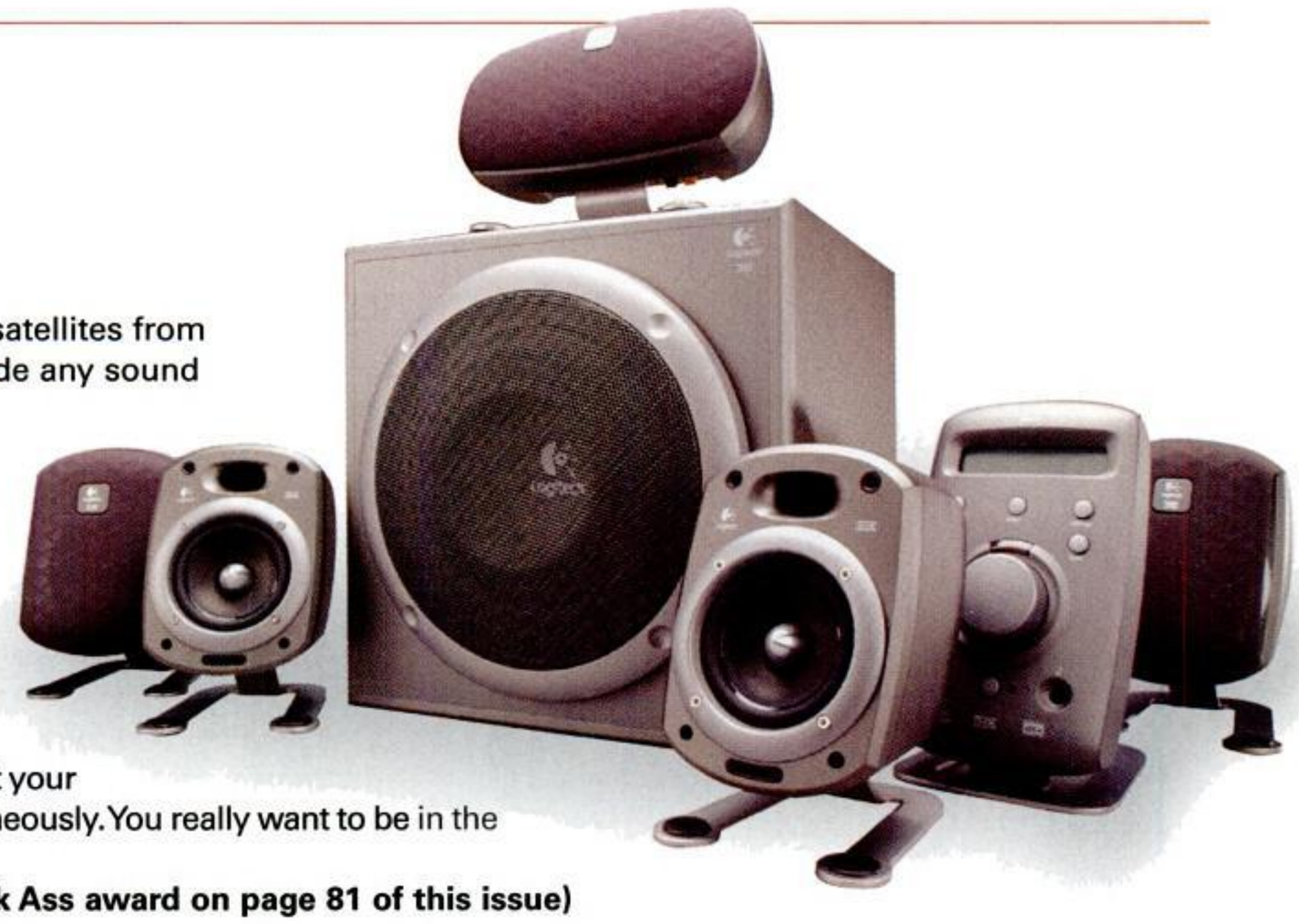
This Gainward GeForce4 Ti 4200 board comes packed with 128MB of DDR SDRAM and a programmable core, and is capable of capturing video from an S-video or Composite source. We chose this nVidia based card as Gear of the Year for one simple reason: It's $200 and we could overclock it to 315MHz core/280MHz memory for near GeForce4 Ti 4600 benchmark scores. Overclocking performance, combined with video-in/video-out and multiple-monitor support, make the Gainward board a no-brainer for Gear of the Year.

$160, www.gainward.com (not previously reviewed)

Dissenting opinions: The ATI Radeon 9000 Pro has programmable shaders and is about the same price as the "Golden Sample," but you sacrifice a whole lot of performance, especially if you enable AA.

SPEAKERS

Logitech Z-680



This outrageous 5.1 speaker set combines the kick-ass satellites from Logitech's Z-560 4.1 set, a digital decoder that will decode any sound stream you throw at it (Dolby Digital 5.1, DTS, analog, whatever), and an earth-rattling subwoofer (louder than we've ever heard before). We're talking about volume levels that border on criminal. The 450W system is so powerful, in fact, it literally made the earth move under our feet. But the Z-680s aren't just deafening. They also sound fantastic, even at blistering volumes.

To top it off, the Z-680s have the best connection options we've seen in a $400 setup. Toslink optical, coaxial digital inputs, and full 5.1 analog inputs will let you connect your PC, a console, and a DVD player to these speakers simultaneously. You really want to be in the sweet spot? Sit between these babies.

$400, www.logitech.com (receives a 10 verdict and Kick Ass award on page 81 of this issue)

Reprinted material

KEYBOARD

Microsoft Natural Keyboard Pro

The latest keyboards from Microsoft and Logitech eschew greatness, so we're hopping into the Wayback machine to give the GOTY award once again to the *original* Microsoft Natural Keyboard Pro. The Natural Pro's layout is perfect—essentially the standard 104-key design with an ergonomic split right down the middle. The arrow keys are in the inverted-T formation that gamers know and love, and the extra keys used to control media playback work perfectly in every app we tried. Plus, the whole chassis is practically indestructible. To seal the deal, the Natural Keyboard Pro even includes an unpowered USB hub with two USB ports, perfect for attaching a DiskOnKey or other low-power device. Grab the Natural Pro while you still can!

$65, www.microsoft.com/hardware (not previously reviewed)

MOUSE

Logitech MX700

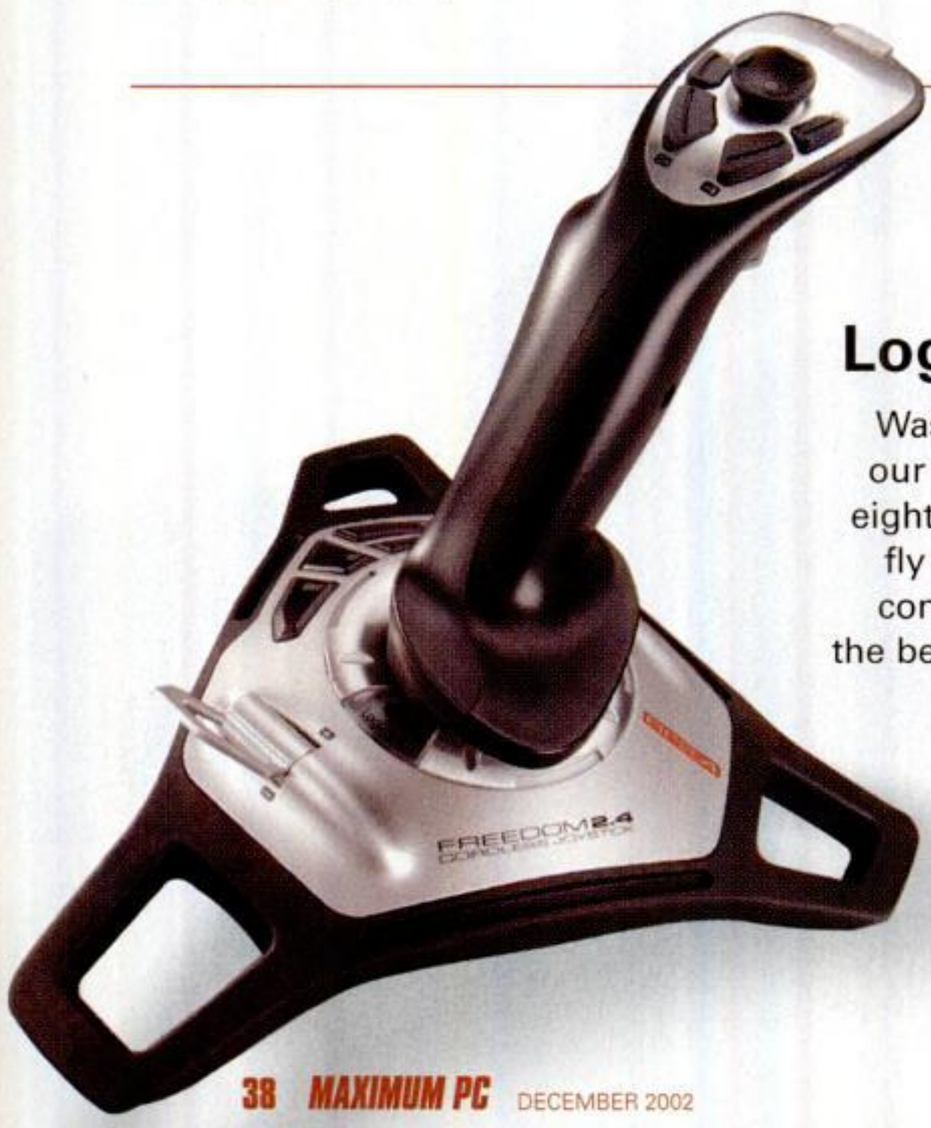
A good gaming mouse is tough to find. Its sensor must be fast and reliable. It needs at least three buttons and a wheel, and it's got to be comfortable enough to use for extended periods of time. And it should be able to withstand the occasional spit-take.

The Logitech MX700 fills all our requirements, and it's wireless to boot! That's right, the MX700 sends updates from the wireless mouse to its base station and then to the PC so fast, we didn't experience any of the traditional wireless flaws, such as jerky cursor movement or warping. But because the MX700 transmits so much data so fast, it eats batteries for lunch. Cleverly, Logitech included rechargeable batteries and a handy recharging station in the radio base.

$80, www.logitech.com (received a 9 verdict and Kick Ass award in November 2002)

GAME CONTROLLER

Logitech Freedom 2.4GHz Cordless Joystick



Was it fate or merely the best luck ever that brought the Freedom 2.4GHz to our desktops the same day that *Battlefield 1942* arrived? With 10 buttons, an eight-way hat switch, a throttle, and a three-axis joystick, it's all we needed to fly our Spitfire and thin out herds of Nazi scum. Toss in the 2.4GHz wireless connection, a comfy stick, and a nicely weighted base, and you have one of the best game controllers ever, categories notwithstanding. We waited all year for a cool new joystick to arrive in our Lab, and at last, we feel fulfilled.

$65, www.logitech.com (not previously reviewed)

And lest we forget: The best gamepad we've ever used is the Thrustmaster Firestorm Dual Analog. Thrustmaster managed to copy everything that makes the default Playstation 2 controller good, but replaces Sony's hand-crippling design with a much more comfortable one **($30, www.thrustmaster.com).**

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GAME OF THE YEAR

No One Lives Forever 2: A Spy in H.A.R.M.'S Way

NOLF2 isn't just a damn fine single-player shooter, it's also the funniest PC game of all time, and more entertaining than 95 percent of all the campy spy flicks it so cannily spoofs. We kid you not: It offers more laughs per minute than most Hollywood movies—and it's just a video game, for Pete's sake!

Aside from the incredibly witty dialogue and movie-like pacing (some levels are stretched taut with high drama, others are played for comedic relief), the weaponry is incredibly varied, so you're always waiting to discover what you'll get to play with next. Poison-tipped crossbow bolts suddenly seem commonplace when you're given the opportunity to immobilize enemies with bear traps—and even bananas. This is the game that you buy for yourself, then evangelize to others—hardcore gamers and casual newbies alike. When you play it—and you will—take special note of the character animation and voice acting. It's the best we've ever seen and heard, and more than complements some of the best environments and event scripting we've ever seen on our PCs.
$50, nolf2.sierra.com (receives a 10 verdict and Kick Ass award on page 94 of this issue)

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stretch your imagination

The CRW-F1 With Exclusive DiscT@2 Technology

The Ultimate CD Recorder

Yamaha's all new CRW-F1 is designed to enhance the style of the contemporary computer workstation. Engineered for easy connectivity via ATAPI, FireWire, USB 2.0 and SCSI, the CRW-F1 delivers reliable performance, high quality and top speed CD recording with whisper quiet operation.

Among its long list of impressive new features, CRW-F1's revolutionary DiscT@2™ Laser Labeling System stands out as the world's only laser based "tattoo" system to etch graphics and text onto CD-R discs, eliminating the need for labels. Next, enter the exclusive new Advanced Audio Master Quality Recording System and hear Yamaha's studio quality advantage in your own living room. Add in the industry first Ultra Speed ReWrite, the triple-guarded SafeBurn multitasking technology and the exclusive live recording mode, and you will discover why critics herald the new CRW-F1 as the *most complete* CD Recorder in the World!

So, whether you are a PC user or Mac user, let Yamaha CRW-F1's extraordinary features and technologies take you to a world with infinite possibilities and where stretching your imagination is just the beginning...

YAMAHA

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OPERATION UPGRADE:

LET'S GET PORTABLE

Deep beneath a notebook's surface sit parts that can indeed be upgraded. Here's how we renovated three aging portables.

Notebook computers are small, sexy, and increasingly powerful. The trade-off, of course, is that they're usually not very upgradeable. Still, there are a few parts you can easily swap out for speed dividends and to extend the life of your investment. We'll show you how to upgrade your memory, add a new hard drive, install a CD-burner, and even add an internal Wi-Fi card.

We specifically steered away from hardcore upgrades such as 3D accelerators and CPUs. Sure, if you're willing to disassemble your entire jigsaw puzzle of a notebook and rip chips off your PCB, such upgrades are possible—but mobile 3D chips and CPUs just aren't available on the open retail market, so we decided not to waste any space on these more complex upgrades. Instead, we grabbed three fairly typical laptops to see exactly what could and couldn't be upgraded by computer civilians. Our case studies include a 2-year-old Compaq Presario 1800t, an 18-month-old Dell Inspiron 8000, and a 1-year-old Compaq Evo N600c.

You should try to buy all your upgrade components from your notebook manufacturer, and make sure you consult the documentation that came with your computer before futzing around with a screwdriver. Memory is the one exception—we got ours from Kingston Memory at **www.kingston.com**. And always, always, *always* disconnect your power *and* remove the battery from your laptop before you open it up.

—WILL SMITH

Toss on your X-ray specs for a look inside this Dell Latitude C810. On the right are the hard drive and PCMCIA slots. Further back resides the CPU and the copper heatpipe, which draws heat from the CPU and moves it to the radiator in the back.

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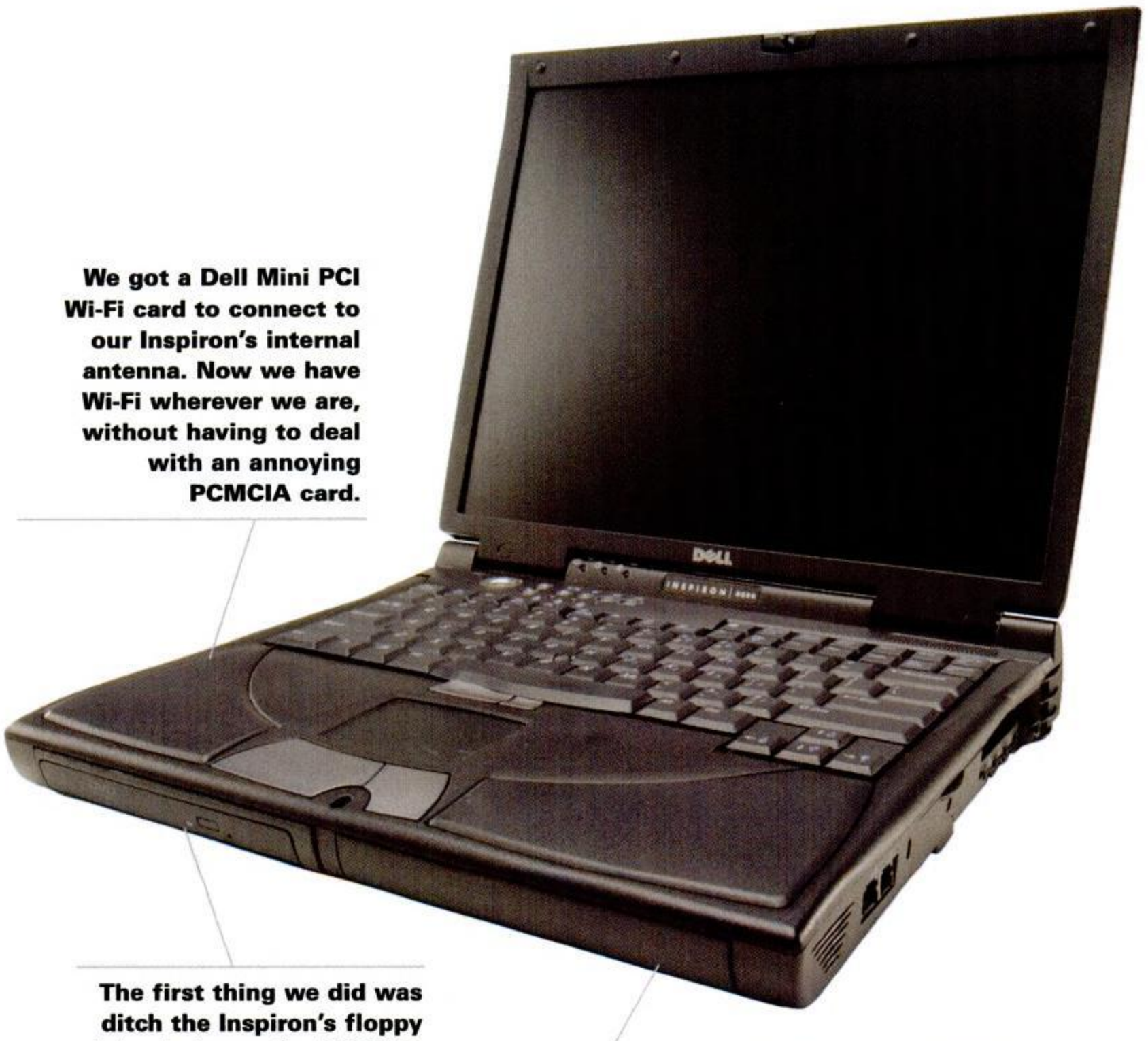
Dell Inspiron 8000



We got a Dell Mini PCI Wi-Fi card to connect to our Inspiron's internal antenna. Now we have Wi-Fi wherever we are, without having to deal with an annoying PCMCIA card.

The first thing we did was ditch the Inspiron's floppy drive in favor of a DVD/CD-RW combo drive. A single CD-R (burned at 24x!) sure beats the hell out of carrying 400 floppy disks.

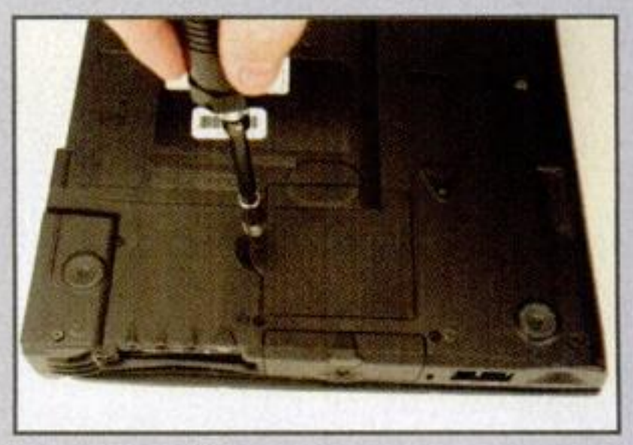
Adding another 256MB of memory might hurt battery life a little, but we'd rather pack a spare battery than suffer through poor performance.

Our Inspiron 8000 was the first 1GHz notebook we ever received, but after more than a year, it began to seem a little sluggish. An upgrade to Windows XP proved beyond any doubt that the stock 128MB memory allotment wasn't enough, so we decided to address this subsystem first. Then, after we broke the third antenna off our PCMCIA Wi-Fi card, we decided we'd prefer an internal model instead.

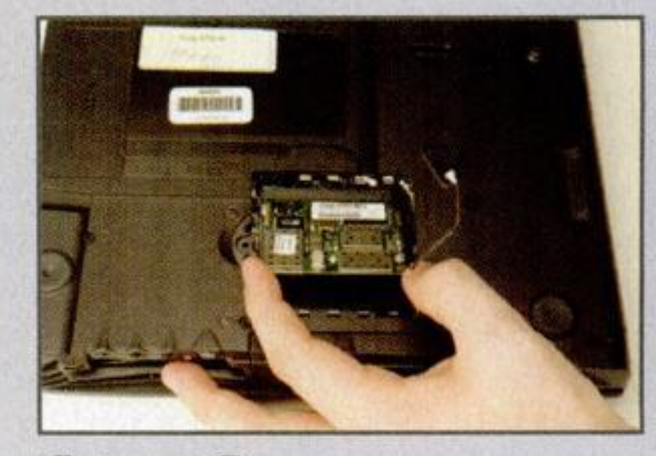
Getting parts was simple. We went to **accessories.us.dell.com/sna/index.asp** and clicked the "Parts for your Dell" link. Entering the service tag from the bottom of the notebook gave us a list of the available upgrades for our laptop.

Upgrading the memory on the Inspiron was a piece of cake. From the underside of the notebook, we unscrewed the screw labeled with an "M," then gently pried off the panel with a flathead screwdriver. Once the rear panel is off, installing memory is just like any other notebook memory upgrade. Check page 44 to see how we installed the memory in the Compaq Presario 1800t. Finally, we replaced the internal modem in the Inspiron with an internal Wi-Fi card, and replaced the floppy drive with a 24x CD-RW/DVD combo drive.

How-To:
Install an internal Wi-Fi card



Step 1: First, open up the Mini PCI slot cover on the bottom of your notebook and remove the existing card. Be careful. If you have a modem already installed, you'll need to disconnect the cable that runs from the card into the PC.



Step 2: Disconnect the antenna cable from its storage position on your Wi-Fi card. Check the documentation to know which connector on the card is live, and which is just a storage position. Then slide the card into your Mini PCI slot, keeping the modem and network cables positioned out of the way.

Step 3: Connect the loose end of your Wi-Fi card's antenna cable to the port inside the Mini PCI bay and replace the panel. Fire up the laptop, install the drivers, and see if you can connect to your network. If you have problems, you may have the antenna cable connected to the wrong port on the Wi-Fi card. If not, replace the screw in the panel and you're ready to go.

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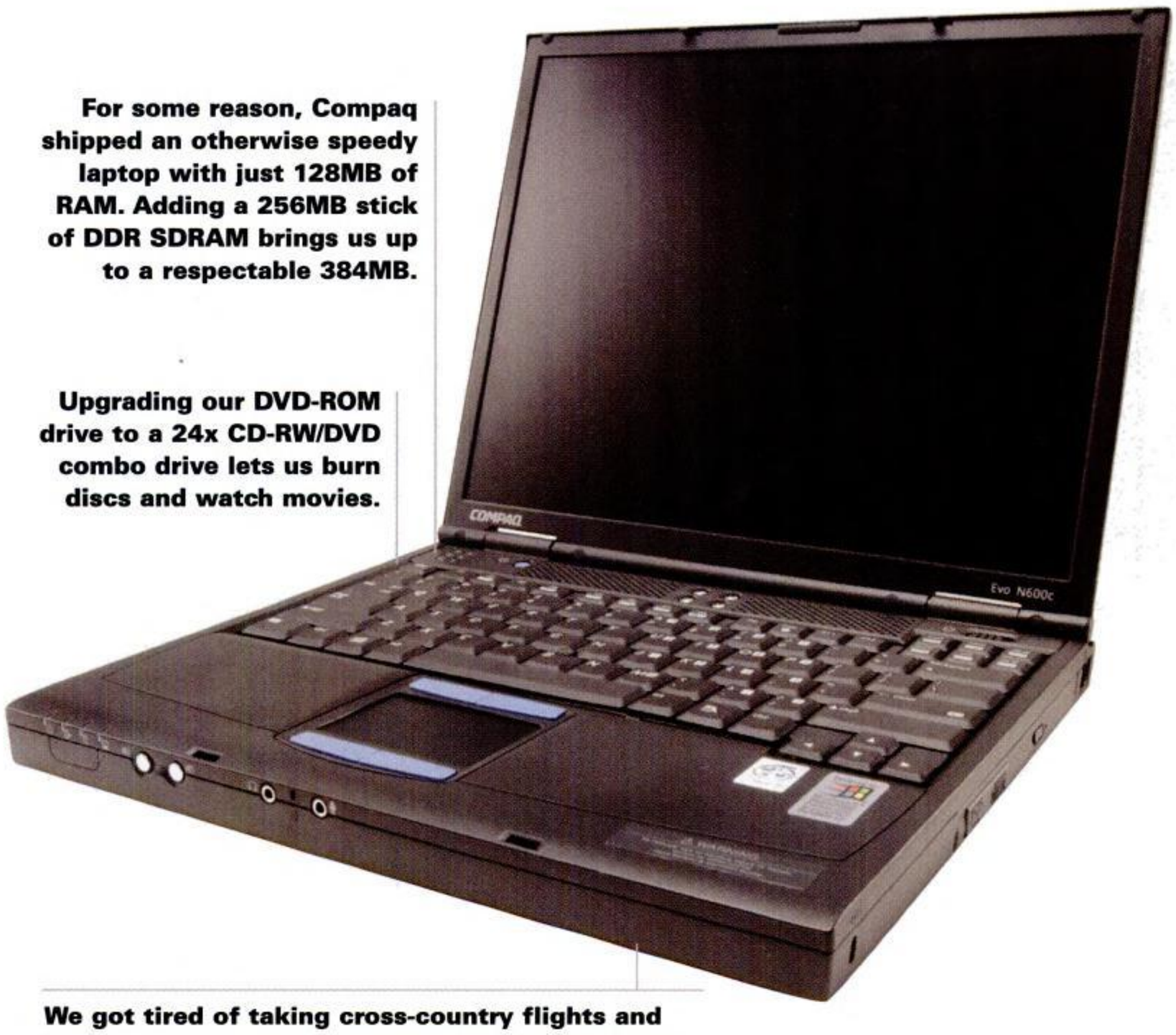
Compaq Evo N600c

For some reason, Compaq shipped an otherwise speedy laptop with just 128MB of RAM. Adding a 256MB stick of DDR SDRAM brings us up to a respectable 384MB.

Upgrading our DVD-ROM drive to a 24x CD-RW/DVD combo drive lets us burn discs and watch movies.



We got tired of taking cross-country flights and having our battery die over Kansas, so we nabbed a spare battery in order to play *Warcraft III* all the way from San Francisco to New York.

Like the Dell notebook, Compaq's Evo N600c uses a 1GHz Intel CPU. But unlike the Inspiron 8000, which uses a 1GHz SpeedStep Coppermine processor, the Evo includes a die-shrunk SpeedStep Tualatin proc (which actually runs at 1.06GHz). The Evo also has slightly different peripherals, thanks to its default two-spindle design (in notebook parlance, each "spindle" represents a drive—a hard drive, a floppy drive, a CD-ROM drive, and so on). With one spindle already dedicated to a hard drive, the Evo's second spindle is a DVD-ROM drive nestled in its single multifunction bay. That means you can't use the multifunction bay for a spare battery with the DVD-ROM in the system, precluding you from running with two batteries and watching a DVD at the same time.

That's not to say that the Evo isn't chock-full of upgrading possibilities. The first thing we did was install another 256MB of PC133 SDRAM to bring the total to 384MB and greatly improve Windows XP's performance. After that, we ditched the stock DVD-ROM drive for a combo 24x CD-RW/DVD-ROM drive from Compaq (this was as simple as flipping the notebook over, sliding a lever, pulling out the old DVD-ROM drive, and sliding in the combo drive).

We never had any intention of running a second battery in the Evo's multifunction bay, but we still went ahead and bought a backup cell for the battery bay. While the notebook can play about 2.5 hours of a movie at full charge, having a second battery effectively doubles the Evo's run time (and the battery swap takes less than a minute).

How-To:
Upgrade your laptop's memory

Step 1: First, find out where your laptop's RAM is hiding. Usually, you can access the RAM slots by opening a small panel on the underside of the laptop. However, some manufacturers hide the memory below the keyboard or near an optical drive. Once you locate the panel, move to step 2.

Step 2: Open up your laptop's memory panel. For this Compaq, we had to get a T 8-size Torx screwdriver bit to get into the panel. If you plan on working on any Compaq notebooks, make sure you have a full set of Torx bits.

Step 3: Insert the new SO-DIMM (a small-outline DIMM) into the RAM slot, and reseal the memory cover. When you start your PC, you'll probably be prompted to enter the BIOS and confirm the memory size change.

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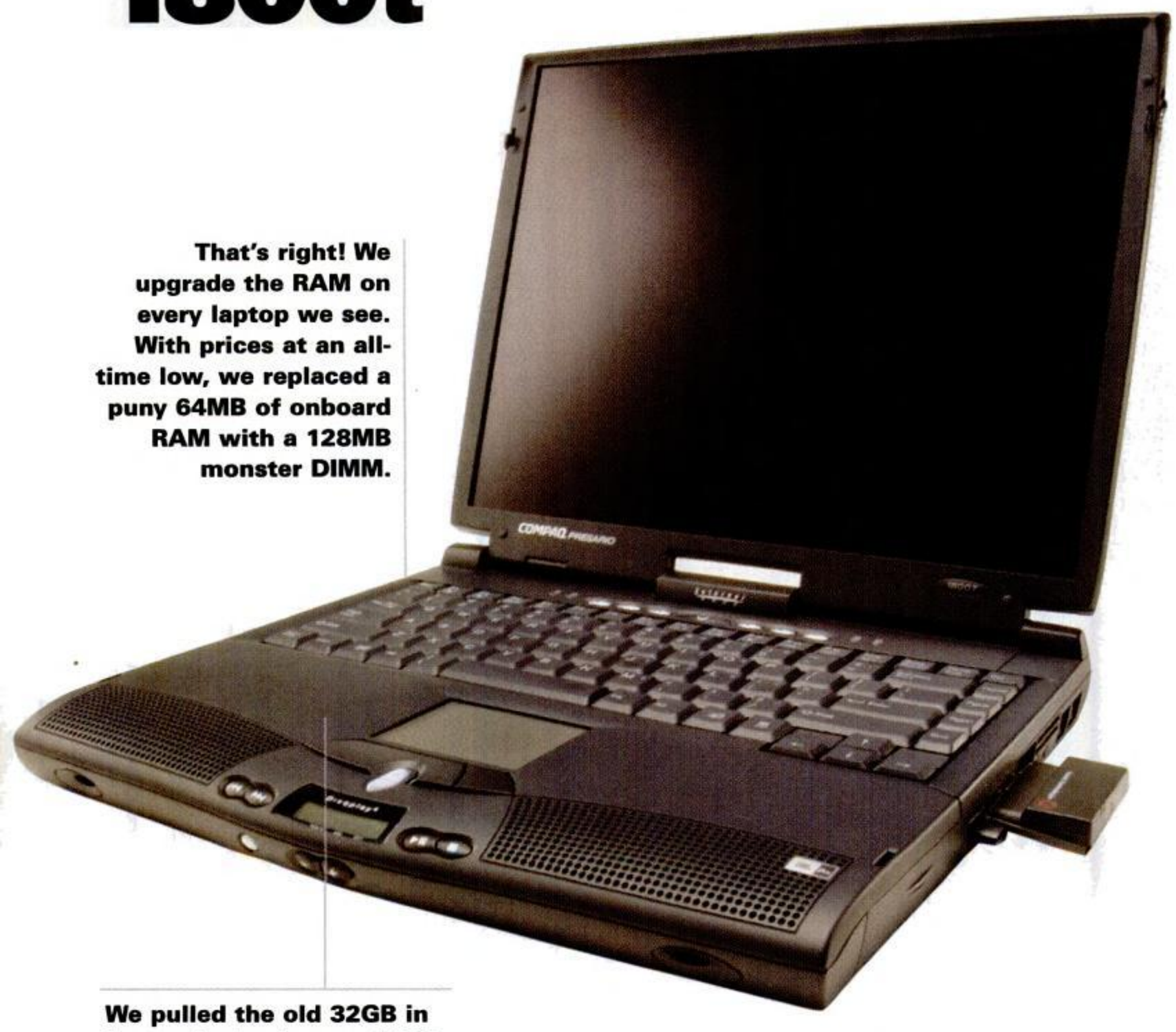
Compaq Presario 1800t



That's right! We upgrade the RAM on every laptop we see. With prices at an all-time low, we replaced a puny 64MB of onboard RAM with a 128MB monster DIMM.

We pulled the old 32GB in favor of a beefy new 48GB 5400rpm drive.

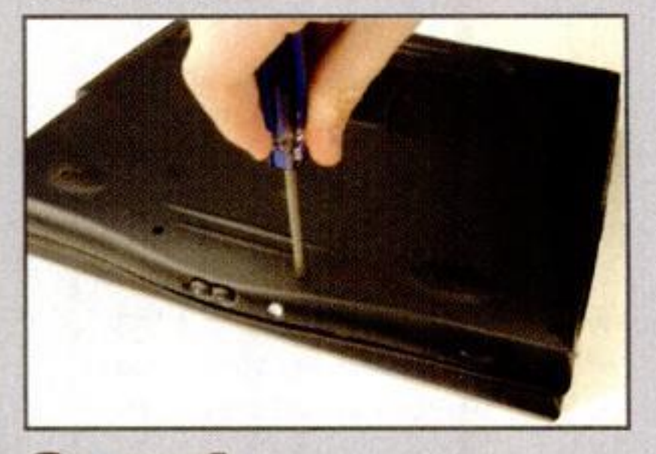
This laptop is so old we weren't able to find anything else that we could upgrade. No Mini PCI slots, no multifunction bays... no real upgrading options.

Once a state-of-the-art laptop, this Compaq Presario 1800t has now fallen from grace in the Maximum PC Lab. Nonetheless, we were determined to give it enough of an upgrade to make everyone want to fight over it again.

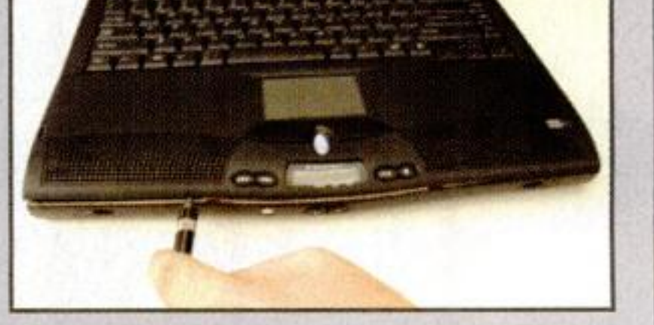
The first step was to give the old girl more memory. Upgrading the piddling 64MB of onboard memory to a robust 192MB was as easy as adding a 128MB SO-DIMM (and on this Compaq, we didn't even need to bust out a funky screwdriver). Next up was the hard drive. The stock 32GB 5400rpm drive was completely filled with MP3s and other media files, so we decided to replace it with a 48GB version of the same drive (see sidebar).

The older your notebook is, the more limited your upgrading options will tend to be. This particular Compaq model pre-dates Mini PCI slots and doesn't even include any upgrading opportunities for proprietary Compaq parts, let alone industry-standard parts. Technically, the hard drive upgrade we're showing you how to do is supposed to be done by a trained technician, and doing it yourself will void the warranty for this particular Compaq notebook. But don't let that stop you: Policies vary, and you might be able to upgrade *your* hard drive without voiding anything.

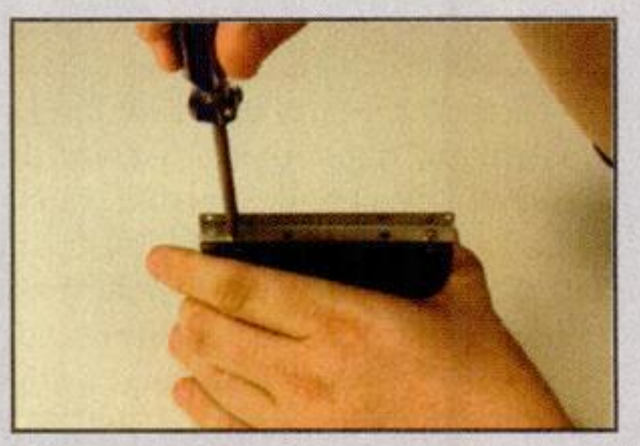
How-To:
Upgrade your laptop's hard drive



Step 1: First you'll need to open the case around the laptop. Carefully unscrew the four screws at the bottom front of the case. Now remove the battery, and unscrew the "bonus fifth screw" that's revealed when the battery is removed.



Step 2: Use a flat screwdriver to gently pry open the edges of the case, then unscrew the three screws that hold the hard drive bracket to the laptop chassis. Carefully unhook the IDE cable and remove the drive from the system. Remove the old drive from the hard drive bracket using a T-8 driver or a star-shaped security bit (both available at fine hardware retailers).



Step 3: Now connect the vacant hard drive bracket to the new drive. Double-check your IDE jumper settings, and make sure the jumper is set to master. Then reconnect the hard drive mount to the laptop's chassis and plug in the IDE cable. Close up your laptop, then fire up the PC. You'll need to reinstall the OS at this point.

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The Practical Upshot

The tight, sandwiched-together interiors of laptops might inhibit upgrading, but we still managed to boost performance and add some useful new features in all three of our case studies.

The one hard-and-fast rule we learned is that laptops just don't ship with enough RAM. If you're looking for a cheap and easy way to upgrade your laptop, cruise over to Kingston's web site (**www.kingston.com**) and grab a stick for your less-than-potent portable. We've never seen a laptop that didn't have some option for memory upgrading, and RAM is cheaper than ever. The 256MB DIMM we plopped in our Evo N600c cost just $70!

While we were able to easily upgrade the DVD-ROM drives in the notebooks equipped with multi-use bays, our trusty old Compaq Presario 1800t didn't include a bay, and we weren't able to find any drive to replace the Presario's old 2x DVD-ROM (maybe the laptop is called the 1800t because it was manufactured in 1800). Of course, we were able to bust loose and install a new 48GB hard drive, so all was not lost. Still, there's a moral to this story: The older your notebook, the more scant your upgrading opportunities.

Finally, installing a Wi-Fi card in the Dell Inspiron at last fulfilled the promise of Mini PCI slots in our eyes (we've been waiting many moons to use these slots). Instead of toting around a never-used 56K modem, we had ourselves wireless network access, and the upgrade job was as simple as swapping in a Mini PCI card.

		UPGRADE 1	UPGRADE 2	UPGRADE 3
Dell Inspiron 8000		**Dell Internal Wi-Fi card $100, www.dell.com**	**256MB PC100 SDRAM $70, www.kingston.com**	**24x CD-RW/DVD Combo drive $380, www.dell.com**
Compaq Evo N600c		**Compaq DVD/CD-RW combo drive $350, www.compaq.com**	**8-cell primary battery $150, www.compaq.com**	**256MB PC133 SDRAM $110, www.kingston.com**
Compaq Presario 1800t		**IBM 48GB 5400rpm hard drive $400, www.ibm.com**	**128MB PC100 SDRAM $60, www.kingston.com**	

The Case Against Hardcore Upgrades

Every few months, a reader will ask us if it's possible to upgrade a notebook's motherboard, CPU, or 3D accelerator. And every few months we regretfully offer the same response: It's not worth the trouble. Notebooks are assembled like 3D jigsaw puzzles, and each puzzle piece is not only difficult to access, but also built to unique heat specifications. So motherboard upgrades are just out of the question. CPU and video upgrades are a bit more feasible, but not recommended.

Let's start with parts availability. Do you know of any reputable dealers that sell notebook CPUs or 3D chipsets? Of course not. Each laptop manufacturer uses a different proprietary formfactor for its video boards (assuming its video chips aren't directly soldered to a proprietary mobo). You could try asking Dell for an upgrade for your Mobility Radeon, but you'll probably hear only laughter on the other end of the line. There's just no place to get mobile parts.

Heat issues further compound the problem. While desktop systems are fairly flexible and can accommodate new parts that generate lots of heat, notebooks are closed systems designed to exhaust specific amounts of heat from their tiny chassis. Add a peripheral that generates too much heat, and you'll soon experience failures in other subsystems. Also remember that OEMs have labs dedicated to testing each individual laptop configuration for heat problems. Normal users just don't have the resources for adequate testing.

Finally, some laptop manufacturers will try to thwart upgrading by using funky security screws instead of garden-variety Phillips screws. At *Maximum PC*, we have the odd-sized Torx bits and star-headed screwdrivers necessary to unlock a laptop's nether regions, but these tools may not be as easy to find in Peoria.

All these factors add up to a grand conspiracy against hardcore notebook upgrading. Still, if you're dead set on prying off your CPU or 3D chip, do yourself a favor and give up on the idea of escaping completely unscathed. If your upgrading exploits succeed, more power to you. If they fail, you've lost your notebook, but had some cheap thrills along the way. ■

NV30

Up Close and Personal

Crystal clear: The crystal inside this housing vibrates at a specific frequency, providing a reference clock that controls your card's memory and core clocks.

Regulate this: The switching regulator works with the capacitors to ensure that the proper voltage levels go to GPU and memory.

VIVO versatility: This Philips chip converts the NTSC signal captured from your videocard's S-video input into a digital stream that can be displayed on your PC or saved to your hard drive. Some videocards handle this conversion on the GPU instead of using an external chip.

DVI do-si-do: This TMDS transmitter chip from Silicon Image takes the information stored in the videocard's output buffer and converts it from an 8-bit signal to a 10-bit signal, and into a format that DVI monitors will understand.

You gotta protect yourself: These diodes prevent ESD (electrostatic discharge) from damaging the videocard's sensitive components, such as the GPU.

RAM-tastic!: The graphics card's DDR memory will give the NV30 processing unit anywhere from 128MB to 256MB of fast storage.

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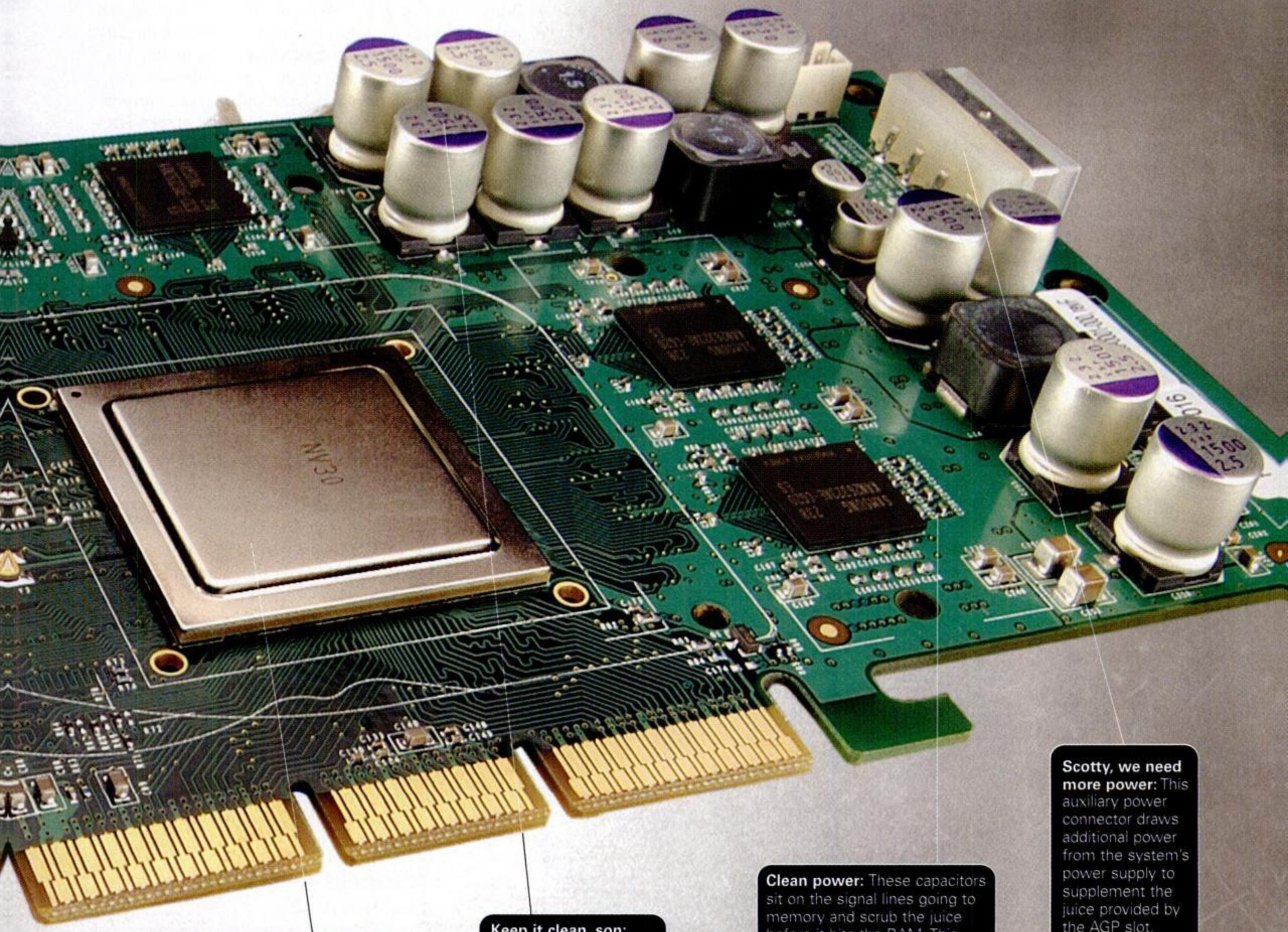
We give you nVidia's upcoming 3D accelerator, the PC industry's most heavily guarded secret and the card most likely to unseat ATI

We got it, you don't! But we are willing to share what we know about nVidia's secret weapon. Don't ask us how we acquired this early prototype of the NV30 superboard, because once you're in the *Maximum PC* "circle of trust," you're probably in way over your head. But we do invite you to enjoy this sneak preview (from a safe distance, of course). On the first two pages, we walk you through the board's key circuitry, which is pretty much common to all videocards. Then, on pages 48 and 49, we delve deeper into the NV30, and explain what makes it such a potent threat to next-generation polygons and textures. (And supermodels, apparently, like it too.)

—BY WILL SMITH



Core control: The GPU (graphics processing unit) lies under this heat spreader. The NV30 is designed to perform millions of specialized graphical calculations every second, and its transistor complexity is far more intense then that of the Pentium 4 and Athlon XP.

Keep it clean, son: These capacitors clean the power and regulate voltage levels going to your GPU and memory.

Clean power: These capacitors sit on the signal lines going to memory and scrub the juice before it hits the RAM. This allows card manufacturers to crank up memory clock speeds.

Scotty, we need more power: This auxiliary power connector draws additional power from the system's power supply to supplement the juice provided by the AGP slot.

NV30

Oh-So-Sexy Silicon!

The card! We're talking about the card!

Since its surprise launch, ATI's Radeon 9700 has spanked nVidia's GeForce4 Ti 4600 in every benchmark category. But now the nVidia brain trust aims to turn the tables on ATI with the NV30. Like the Radeon 9700, the NV30 offers full DirectX 9 support, as well as fast memory and nouveau videocard requisites, such as AGP 8x support and DVI output.

nVidia is tight-lipped about the NV30's details, but we managed to squeeze the company for a few innocent factoids. We know that the NV30 will ship on a 0.13-micron process, boast eight processing pipelines, and likely feature 500MHz DDR II memory. Read on to find out how the chip will fit into your upgrading plans.

Let's Get with the Program

The main thing that separates the DirectX 9-savvy NV30 and Radeon 9700 from their DirectX 8 brethren is more-advanced programmable shader units. Aging DirectX 8 videocards, such as the GeForce3 and GeForce4, can run short programs on every pixel and vertex—each program will entail just a few operations. The DirectX 9 spec, meanwhile, demands that a videocard be able to execute a minimum of 1,024 vertex operations per vertex, and 160 pixel operations per pixel. A DirectX 9 card like the NV30 must also be able to string operations together using loops, branches, and call-and-return statements.

Sounds impressive, right? Well, the NV30 also goes beyond the DirectX 9 spec by allowing developers to create shader programs that are *thousands* of instructions long. Current shader apps simply modify existing textures, but nVidia says the NV30's shaders will let programmers write shader programs that actually describe what a texture should look like (as opposed to merely modifying a texture originally created in *Photoshop*). This should make bump map creation much easier for developers (a bump map adds surface irregularities to models).

In a current DirectX 8 game, both the base texture that gives the object its look and the bump map are created by an artist in *Photoshop*. While there are some exceptions (such as the dynamic bump maps created for rippling water), most bump maps for walls, models, and all other objects have to be painstakingly crafted by an artist. But with the new programmability granted by DirectX 9, bump maps can be generated on the fly by writing a simple shader program that describes the surface irregularities programmatically. This will make it easier for developers to create bump-mapped surfaces, which in turn means gamers should see *more* bump-mapped surfaces in future titles (like *Doom III*).

This svelte young lass shows the power of complex pixel and vertex shaders. The wrinkles on her skin, her whiskers, and the shiny highlights on her body are all created with shader programs.

Precision-Engineered

Every time two textures are blended in a 3D game or application, some of the color information contained in the textures is lost. This can create ugly artifacts in the final output. It turns out that the current color depth standard—32-bit color—isn't precise enough. It provides just 8-bit integer precision to the red, green, blue, and alpha channels that determine a pixel's color (a pixel's alpha value affects transparency). This means a videocard's output can show only 255 levels of blue, 255 levels of green, and 255 levels of red, causing splotchy colors when several different textures are applied to a single surface. The limited color range also prevents game developers from having very dark areas and very bright areas in the same scene.

The NV30 and other DirectX 9 accelerators address these color problems by adding support for 128-bit floating-point precision through the entire 3D pipeline. That means that each color and alpha channel is described by a 32-bit floating-point number—an immense improvement when you consider that current accelerators use 8-bit integers to describe each color channel. The upshot is that 128-bit color provides a nearly infinite color palette for 3D games.

The downside is that 128-bit textures are four times as large as similarly sized 32-bit textures. Because memory bandwidth is already a bottleneck for most 3D accelerators, one shouldn't expect many developers to use 128-bit textures, unless there's a significant breakthrough in memory performance.

Speaking of Memory Performance...

Luckily, there *has* been a significant breakthrough in memory performance, and it's called DDR II SDRAM running at 500MHz. Because the memory is doubled-pumped, that's an effective memory clock speed of 1GHz, kids! Loads of this DDR II stuff will be soldered to NV30 boards.

We don't know how wide the NV30's memory pipeline will be, but if we guess

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conservatively and assume it's only 128-bits wide, the effective memory bandwidth on the NV30 board will still be an impressive 16GB/sec. Bump the bit path up to 256-bits, and you have an astounding 32GB/sec of theoretical memory bandwidth. Compare this with the mere 10.4GB/sec bandwidth of the GeForce4 Ti 4600's memory pipeline, or the 19.8GB/sec mustered by the Radeon 9700 Pro, and you can see why we're impressed. In fact, when the NV30 arrives, your memory bandwidth will no longer be the bottleneck in your overall graphics pipeline. No, that unfortunate distinction will once again fall back on the GPU.

In addition to using greater color depths in their textures, developers will be able to use their new memory bandwidth to pull off cooler texturing tricks with their programmable shaders. For example, instead of blending up to 12 different textures to create outrageous visual effects, developers will instead run a small number of complex shader programs on individual pixels to accomplish the same effects. This strategy is very GPU-intensive, to be sure, but because these operations have to happen to every single pixel in a larger texture, a wide memory pipe is absolutely necessary.

But Is the NV30 Faster Than the Radeon 9700 Pro?

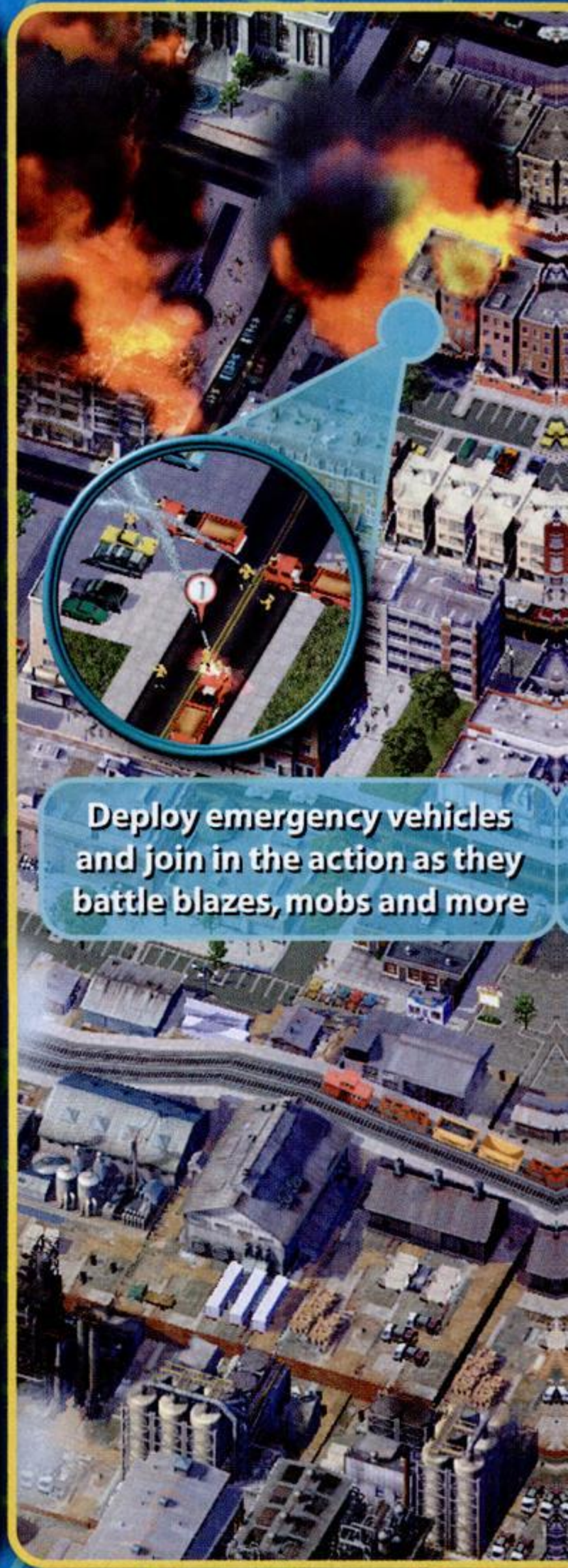
Many questions remain about the NV30: When will it ship? How much will it cost? How fast is its core clock? How wide is its memory pipeline? What's its memory loadout? And what about its benchmarks—can it beat the Radeon 9700 Pro?

We might have an early-early, far-from-final, don't-quote-us-on-nothing beta sample of the NV30 in the Lab, but nVidia wouldn't commit to any hard information, so we can't answer any of the questions above (and we certainly can't give you any benchmarks). But we hope to have a fully reviewable board in time for next month's issue, so stay tuned for our final evaluation. At this point, we'll just go out on a limb and say that all indicators suggest the NV30 will be a serious challenge to the Radeon 9700 Pro. ■

Nine out of 10 videocards prefer to pose with cover models than with out-of-shape editor dudes. Or so studies indicate.

God's Hand

May



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Feel the rhythm of the city: peaceful protests and rowdy riots, noontime crowds and nighttime calm

ɔity of your dreams.

Immerse yourself in the lives of your Sims.

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1 Handspring Treo 270

The perfect gift for people who carry the weight of the world on their shoulders is the gift of a lighter load. No, we're not suggesting that you help them with their problems, but with a Handspring Treo 270, they'll at least have one less gadget to haul. The Treo combines a cell phone and PDA in a single compact unit. A full-color screen, 16MB of RAM, a micro-browser, and a keyboard make the Treo 270 the best GSM-capable PDA out there. Compatible with Cingular's GSM network, the Treo 270's *Blazer* application lets you browse web sites over the existing GSM data-enabled networks and is ready to support GPRS when it goes online. **$500, www.handspring.com**

2 Sennheiser Wireless RS85

Three, possibly four times a day, Technical Editor Will Smith manages to turn around in his chair and yank about half his desk crap onto the floor when his headphone cord wraps around the arm of his chair. It's great fun for the staff, but bad news for Will, his headphones, and the wreckage that is his desk. Luckily, there's a solution: the Sennheiser RS85 Wireless headphones.

Sennheiser includes everything you need to connect the RS85s to a PC, TV, stereo, or MP3 jukebox. The open-ear headphones operate in the 925MHz frequency band, so they can blast great-sounding tunes up to 40 feet from the transmitter base. Sennheiser thoughtfully included a pair of removable batteries. This lets you charge one battery in the base station while the second is powering your headphones. **$270, www.sennheiser.com**

3 Motorola Talkabout T5820

You're at the movie theater snack bar when you suddenly realize that you're not sure whether your date likes butter-flavoring, and if Coke is OK in Pepsi's stead. You don't want to make a bad impression, and you won't if you go to the movies prepared with two-way radios. Trust us, it's suave.

The Motorola Talkabout T5820 is a nice set, with 22 channels, 10 call tones, a backlit display, battery indicator, and a plug for headphones. Plus, the GMRS radios have a five-mile range, rubberized grips, and a weather resistant exterior. A confirmation tone signals when you're done talking so you don't have to say "over." **$150, www.motorolatalkabout.com**

Digital Toys for girls and boys

The holidays are meant to be enjoyed, and, dammit, we want to help you with that. Our gift to you, dear readers, is this year's PC Peripheral and Gadget Guide—a compendium of PC paraphernalia that should help you shop for the impossible-to-please computer geek in your life. Or you could just skip this article, and buy him or her a 12-month supply of Cheese Doodles. It's your call.

With their customary style and candor, the *Maximum PC* editors have personally tested every item in the article—including me!

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4 Shuttle Pro

Keyboards and mice are great, but they get asked to do a hell of a lot more than they signed up for. You already know this if you've ever struggled with isolating the right spot in a video clip or audio track.

So don't recoil from the freaky, paddle-shaped Shuttle Pro, embrace it. It's got 13 programmable buttons that you can assign to commands (which you'll need to do in the unlikely event your editing software isn't already among the included configurations). But the real joy comes from the jog dial in the center that scoots video frame by frame. Another self-centering dial with a comfortable rubber grip can be used for locating passages in audio tracks, or even DJ-style scratching—if you dare. **$110, www.contourav.com**

5 Meade Capture View Binoculars

Forget for a moment what people might think, and consider all the perfectly respectable uses for a set of binoculars that also takes pictures. We'd like to believe there are some. Between the lenses of the Meade Capture View Binoculars sits a digital camera that can store up to 45 images at 640x480 (or 100 images at 320x240). Also included are a carrying case, a lens cloth, and a 6-foot USB cable. Since the Capture View doesn't have a flash, it's limited to outdoor use. All you need are two AAA batteries, and the next thing you know, you're taking pictures that we hope will never be the subject of a lawsuit. **$100, www.meade.com**

Digital Toys

RoadWired Advanced Protection System

"During my last trek from New Guinea to Borneo, I spent several days traveling with East Timorese freedom fighters. As my companions and I traveled through the hot coastal lowlands, we saw the ravages of revolution firsthand. After a midnight raid by the nationalists, the only possessions I retained were the clothes on my back, and the contents of my trusty Advanced Protection System laptop sleeve. With my bag slung over my shoulder by way of its comfortable, padded, nylon strap, I continued my journey in the perennial rain of the Indonesian peninsula. Luckily, my Compaq Armada M700 was well-protected from the elements in its corrosion-resistant covering, and my worldphone and papers fit snugly in the pocket of the APS's outer flap." Available in Black, Yellow, Gray, and Red.

$35, www.roadwired.com

Trek's ThumbDrive Touch

Give your loved one the gift of privacy with the ThumbDrive Touch. It's classic USB-based flash memory (in capacities from 16MB to 128MB) with a twist—a biometric sensor. The first time you use the ThumbDrive, you "enroll" by placing your fingertip on the sensor. Once your print has been recorded, the key can be partitioned into public and private zones. The private area can be accessed only with the same fingerprint.

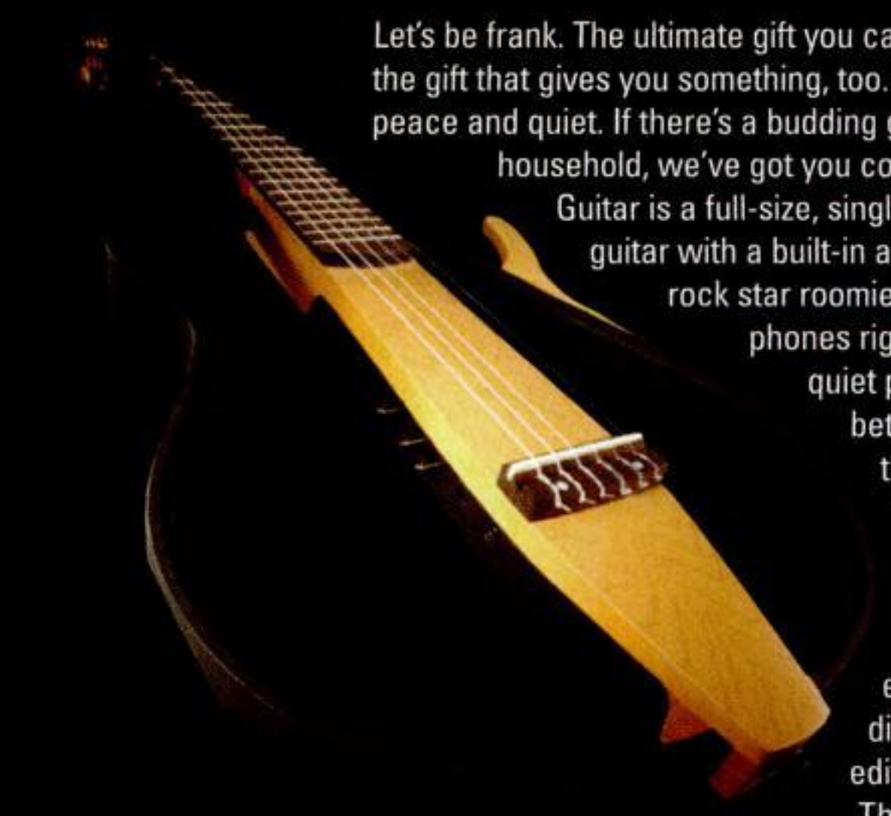
Sever your finger while making holiday treats? No prob! A backup password can also unlock the private area. If the offenders try to beat the password out of you, the 2.5x1-inch key can be easily swallowed, if it comes to that. **$70 (for 16MB, pictured), www.trekstorusa.com**

Labtec Axis-002

Now that *Counter-Strike* includes voice communication, we expect to see a lot more games shipping with support for the same. After all, it's much more satisfying to hurl insults at a fragger who can hear every nuance of your tirade. Enter the Labtec Axis-002 headset. This little number is a comfortable, behind-the-head headphone with an added bonus: a boom mic. You can plug the Axis-002 into your soundcard, and be screaming at online opponents in no time.

Because most headset/microphone sets are designed for telemarketers and other "business" apps, they just don't sound very good. That's what truly sets the Axis-002's apart. They sound as good as a stand-alone pair of open-ear 'phones. **$30, www.labtec.com**

Yamaha's Silent Guitar



Let's be frank. The ultimate gift you can give to others is the gift that gives you something, too. Like, for example, peace and quiet. If there's a budding guitarist in your household, we've got you covered. The Silent Guitar is a full-size, single-pickup nylon string guitar with a built-in amp—just have your rock star roomie plug his headphones right into the neck for quiet practice. Or even better, have him send the signal to his PC via the line-out jack, where the output can be mulched with software effects or recorded directly into an audio-editing application. The fretboard is made of lovely rosewood over a mahogany neck of decent heft. The amp includes two reverb settings, and an auxiliary-in for playing along with Jimi. The Silent Guitar says "I support your dreams" without blurting out, "You suck at the guitar."

$700, www.yamaha.com

Hello Kitty USB Hub

What could be more lovable than Hello Kitty? How about Hello Kitty helping you work? While a creature possessed of such button-cute looks and technical savvy may seem a tad far-fetched, the Hello Kitty USB Hub is indeed a PC user's friend (and besides, didn't *Small Wonder* help us over our prejudice of girly-girl bots?). The hub brings two USB ports to the front of your PC for convenient operation of your peripherals. But Kitty doesn't just sit idly by. She works right alongside you, tapping away on her personal keyboard, moving her head from side to side, and every so often interjecting a wee-voiced utterance (despite her complete absence of a mouth). Word to the less fun-loving types: HK's supplemental actions are strictly optional. **$90, www.dreamkitty.com**

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Digital Toys

X-Arcade Controller

X-Arcade Infomercial Script, Draft 4:

Bob: Remember how we used to spend hours at the coin-op arcades as kids?

Katy: Oh, Bob, do I ever!

Bob: Well, the 20-button dual joystick X-Arcade Controller brings all that arcade action into your living room. It's so realistic, you just wouldn't believe it!

Katy: That's so true! The buttons even have that "clicky" feeling.

Bob: And this is real arcade wood, Katy, not that tacky faux-wood veneer…

Katy: (looks toward audience)…Oh, I hate that!… (audience laughs)

Katy: You know, Bob, my daughter is even crazier about pinball than she is about boys! So one of her favorite things about the X-Arcade is the pinball flipper buttons on the side.

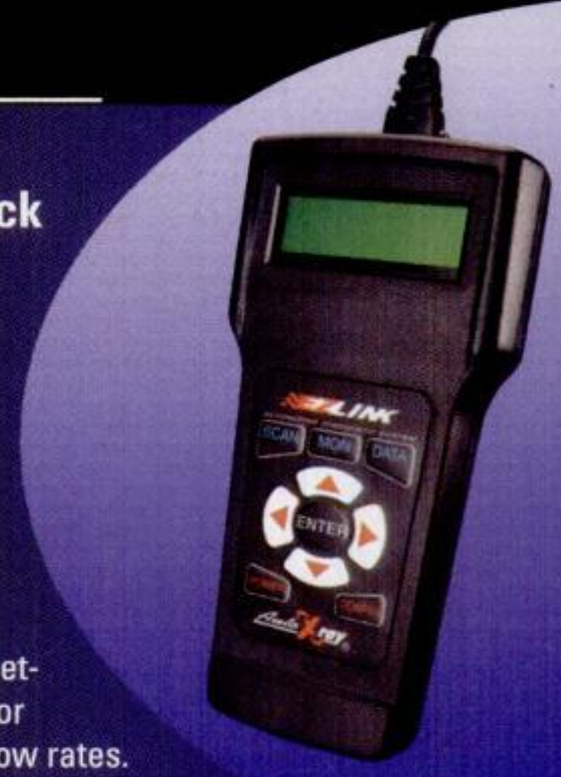
Bob: She's a wild one! (laughter, then applause)

$150, www.x-arcade.com

Motorola FreeCharge

Do you struggle over what to buy the wild-eyed Armaggedonist in your life? It seems like those folks took care of all their needs when building their Y2K bunkers. Well, here's an idea: the Motorola FreeCharge. It lets you recharge your cell phone without any other electricity source. Using the same technology behind the hand-crank FreePlay radios, Motorola's FreeCharge gives you about five minutes of talk time after less than a minute of crank action. The FreeCharge also contains a 1,000mAh nickel-metal hydride battery that can be charged via your phone's regular charger. When charged, the FreeCharge's battery can power your phone without cranking the arm. A modular system lets you swap out the plug to support other phones. Combined with a sat phone, the FreeCharge is the perfect gift for the aftermath. **$80, www.motorola.com**

Auto X-Ray EZ-Link Pro-Pack



In this day and age, you'd think auto makers could give us more than a vague "check engine" warning. Enter the EZ-Link Pro-Pack. Designed for car enthusiasts with PCs, the EZ-Link hooks up to the OnBoard Diagnostic II jack found in most late-model cars. The scanner will display error messages in plain English, and grab such data as barometric pressure, battery voltage, O2 sensor readings, manifold air temp, and air flow rates. The scanner's firmware can be updated through the Internet for newer vehicles.

Give this to someone who already has a pair of coveralls and a personable manner, and it's not just a gift, it's a livelihood.

$450, www.autoxray.com.

Scott eVest Version 2.0

We live in a high-tech, go-go-go world, and the need for portability has never been more dire. How else do you explain the man purse? Fortunately, the Scott eVest offers tech-toters a more tolerable option, not to mention way more space for schlepping around stuff. The fashionable, water-repellent garment sports 17-plus pockets of varying sizes to accommodate all the digital doohickeys of modern life, and then some. A small card in each pocket suggests which items are best stored within. You'll be amazed by how much gear you can lug around on your person! Throw in the patented Personal Area Network, sewn-in conduits for wiring, machine washability, and removable sleeves for use in warmer climes, and you've got one well-outfitted recipient.

$120, www.scottevest.com

PCToys Special Edition Marvel Fan Grills

You don't need X-ray vision to see that these official Marvel fan grills from PCToys are super-powered versions of pedestrian grills. Like Captain America's shield protecting him from the Red Skull's assaults, these brushed or powder-coated steel babies keep your digits safe from meeting a sharp, whirling doom. Kryptonite and bullets will bounce right off 'em, but cool air pulled by your 80, 92, or 120mm fans will cruise on through.

Available in Wolverine, Spiderman, and the Punisher designs (super villains, damsels in distress, and sidekicks aren't included).

$27-$45, www.pctoys.com

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Discover the whole Indi DVD story at www.tdk.com, The Digital Sweetspot™.

Digital Toys

Plantronics M1500 Cordless Headset Solution

While this product's name may sound orthopedic in nature, you needn't be the least bit disfigured to use it. The Bluetooth technology that makes this M1500 headset so special is for everyone. Sure, near-useless Bluetooth dongles and PDA adapters have been around for months, but the Plantronics M1500 actually serves a purpose. You can leave your Bluetooth-phone on your desk, in your backpack, or on the seat of your car and simply answer your calls with the wireless headset. The range of the headset is about 15-feet at best, but how often do you wander much further from your phone? Since most phones aren't equipped with Bluetooth-radios, Plantronics offers a version with a small dongle that you plug into your current phone's headset jack. **$200, www.plantronics.com**

Cornea Systems CT1702T LCD

The Cornea Systems multimedia LCD is an over-achiever, to say the least. With both DVI and analog PC video inputs, the Cornea looks stellar in its native 1280x1024 resolution. Console gamers can jump for joy because the monitor has RCA and S-video inputs, too. And if mashing your thumbs is just too much activity, hit the couch, grab the included remote control, turn up the bundled speakers, and channel-surf the built-in TV tuner. And the CT1702T costs just a few bucks more than an average 17-inch LCD without all the trimmings. It may not be the best desktop LCD ever created, but it's the perfect gift for a big geek with little room. **$900, www.corneasystems.com**

Belkin 65-Piece Toolkit

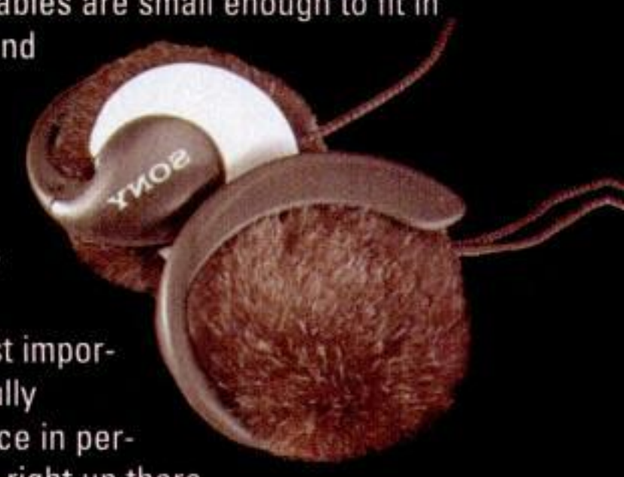
The only place where you'll find more tools than this is at a Chili's happy hour. But unlike that advertising rep who's face-down in the Southwestern Eggrolls, you'll want to keep *these* tools nearby at all times. Belkin's toolkit includes darn near everything you need to take apart, clean, and otherwise tamper with the internal workings of your PC. A Trapper Keeper-size case houses a complete set of bits—Phillips, standard, Torx, and square—so you can unscrew pretty much anything. There's also a vacuum/blower to clean out crevices, pliers, wire strippers, a grabbing tool, and a freakin' flashlight. We could go on and on. Hey, there are 65 pieces total. **$80, www.belkin.com**

The Coldmate Portable Refrigerator

You're camped out in *Unreal Tourney 2003*, waiting for the next sucker to walk into your crosshairs, when it suddenly hits you: I could use a beer. "Woman, git me a brew," didn't work for Dad and it won't work for you. So now what? If you've got the Coldmate Portable Refrigerator, you simply lean over, pop open the door, and grab yourself a cold one. Manufactured by Princess International (seriously), it's a mere 11-inches tall, and fits comfortably under your desk or TV tray. The Coldmate uses an electric Peltier cooling system that makes less noise than your PC's fan, and can be plugged into your car's cigarette lighter for cold on the road. It's the ultimate accessory for sedentary living. All we need now is Homer Simpson's Barcalounger crapper, and we'd be in hog heaven.
$90, www.plowandhearth.com

Sony Furry Clip-On Headphones

From the Land of the Rising Sun comes a product that's sure to be a hit the world over. We're talking about fur-covered, open-ear headphones (model number Q33F). These babies are small enough to fit in a pocket, yet capable of a big sound, and include features you might find in Sony's full-size headphones: relatively huge 30mm drivers, neodymium magnets, and gold-plated plugs. The cord is "minidisc-friendly," designed to only reach a shirt pocket, but an extension cord shouldn't be too hard to find. Most importantly, your ears couldn't be happier, fully swathed in soft, fuzzy fur. As an advance in personal comfort, these headphones rank right up there alongside quilted toilet paper.
$40, www.sonystyle.com



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This could be you!

Our Maximum PC Hardcore Home-Enthusiast Action Figure accomplished all his holiday shopping in a timely manner from the comfort of his own home—by surfing the web. Here are some recommended URLs:

- ➤www.newegg.com: PC parts and peripherals at competitive prices
- ➤ww.googlegear.com: A huge selection of PC parts and peripherals
- ➤www.coolerguys.com: Cases, modding accessories, fans, coolers, overclocking supplies
- ➤www.outpost.com: Fry's Electronics' online store
- ➤www.thinkgeek.com: Quirky, fun hardware, toys, and miscellany
- ➤www.pctoys.com: Case-modding products for the "radical, performance-addicted PC counterculture."
- ➤www.mwave.com: All things computer-related
- ➤www.directron.com: An array of PC parts and accessories, with an emphasis on customer service
- ➤www.frozencpu.com: Cooling and case-modding galore
- ➤www.xoxide.com: Wiring, cooling, and other things for tricking out your rig
- ➤www.resellerratings.com: customer reviews of products

Action Figure Look-Alike Contest!

Do you look like the dude on this page? Could you at least give it your best shot? We are now accepting submissions for the Maximum PC Action Figure Look-Alike Contest! Send us high-quality digital photos of your best attempts at mimicry, and we'll award winners in three categories—Funniest Photo; Best Make-Up, Costume, and Set Design; and Best Physical Likeness. Each winner will receive a $150 grab bag of hardcore PC paraphernalia. Send your pics to input@maximumpc.com by January 15, 2003. Include no more than three images, and make sure to include your full name and daytime phone number.

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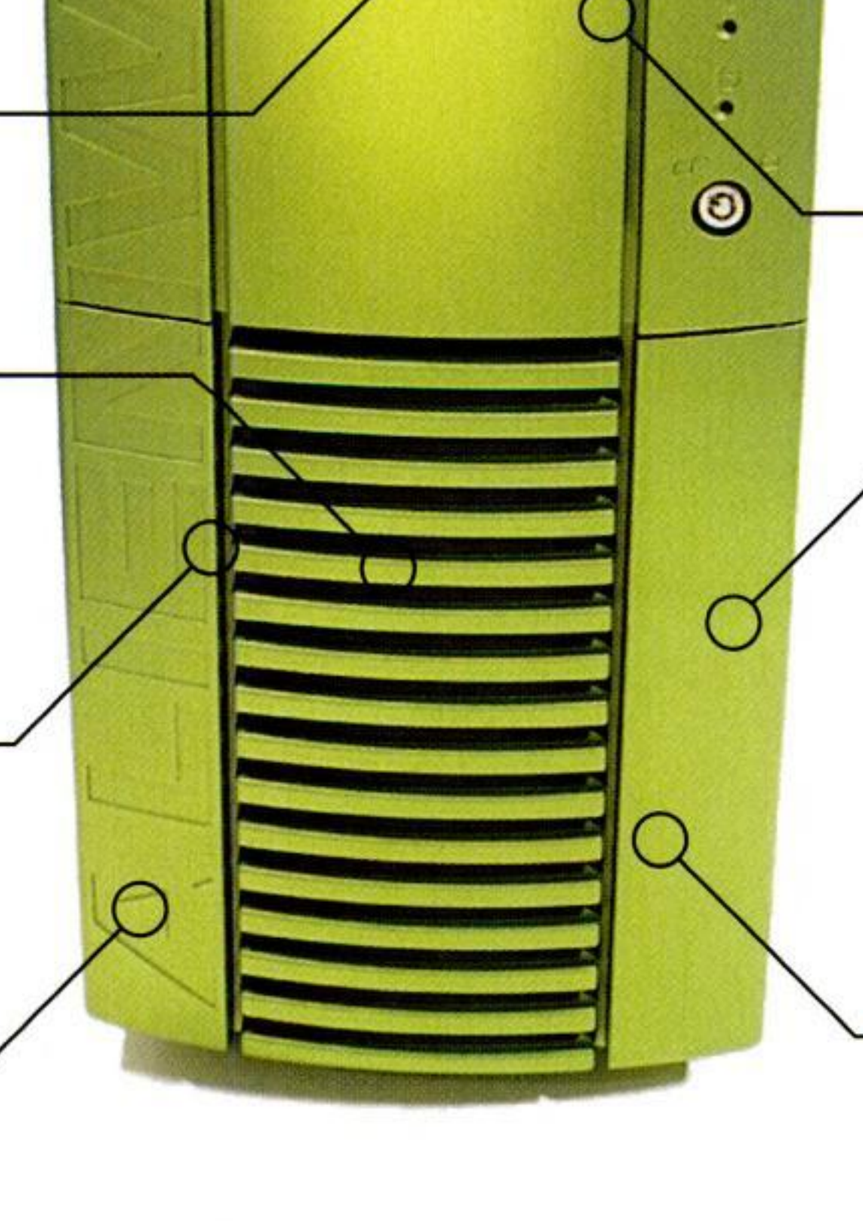

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Ask the Doctor

Symptom → Diagnosis → Cure

Have a burning PC problem? How about a burning PC sensation? We're more than happy to help you with your PC problems, but you might want to get that sensation thing checked out by a qualified sensation checker-outer. If you have PC questions, send them to **doctor@maximumpc.com**. Just remember: We can't answer every e-mail. Oh, no—not by a long shot.

Windows 2000 Clean Start Conundrum

I really enjoyed your Clean Start articles for both Windows 98 and XP. However, I run Windows 2000, and need some advice on setting up a boot CD. I don't believe that I can set up the boot information for the CD using a Win98 startup disk as your previous article states, because I'm using the NTFS file system. If I'm to make the first CD in the recovery series bootable, what files do I use and where can I find them on my system? I'm very interested in completing this process, as I've had to reinstall the entire OS and a plethora of updates one too many times in the last 18 months, and need to simplify my life before the twins (due in late March) arrive.

—GREGG SCHUMAKER

You're right: Using a Windows 98 boot disk with an NTFS hard drive leads to unpredictable results with *Drive Image*. On some systems it works, but on others you just can't see the NTFS partitions.

To restore a Windows 2000 system, you can either use the rescue disks that *Drive Image* creates, or you can boot off the *Drive Image* install CD.

If you want to get really fancy, you could create a special bootable CD with the images from either the floppy disks or from the *Drive Image* CD. However, we could fill five pages on a topic this complex and it's not guaranteed to work. Creating your own boot image for a bootable CD should only be undertaken by someone who's familiar with the inner workings of bootable CDs.

Notebook Video Drivers, Part Deux

Where would I find the new updated video drivers for ATI Mobility Radeon 7500? They're impossible to find on ATI's web site.

—BRANDON L. THOMPSON

The drivers are impossible to find because they're just not there. Like nVidia, ATI doesn't provide drivers for its mobile 3D accelerators. Because the notebook cards are tightly integrated with the rest of the machine, and because each laptop can have a slightly different rev of the same basic chipset, doling out a single driver for every machine could have unpleasant consequences. If you want to get a new 3D driver for your laptop's 3D accelerator, you need to hit up your laptop manufacturer.

More on Defragging NTFS

I recently tried to defragment my hard drive with a disk defrag utility that's built into Windows XP Pro. After analyzing the drive, the app recommended I defrag, so I told it to do so and left the computer alone. Upon completion, the drive still showed a lot of red fragmented files in the graphical display and the report showed thousands of files that are still fragmented. If I run the app again, the same thing happens, ad nauseam.

—JEREMY LEES

You've stumbled upon the problem with XP's integrated defragmenter. Like any defragmentation program running in conjunction with XP, it's not able to defragment an application that's currently active. In trying to defragment your system drive, the majority of OS files won't be touched by the defragmenter.

To fix this, we recommend getting a defragmentation program that'll run before Windows is fully started. *Diskeeper 7.0* will defragment your system files and also keep them from getting refragmented using a combination of scheduled defrags and the proprietary Frag Guard technology, which helps keep the OS from fragmenting your filesystem.

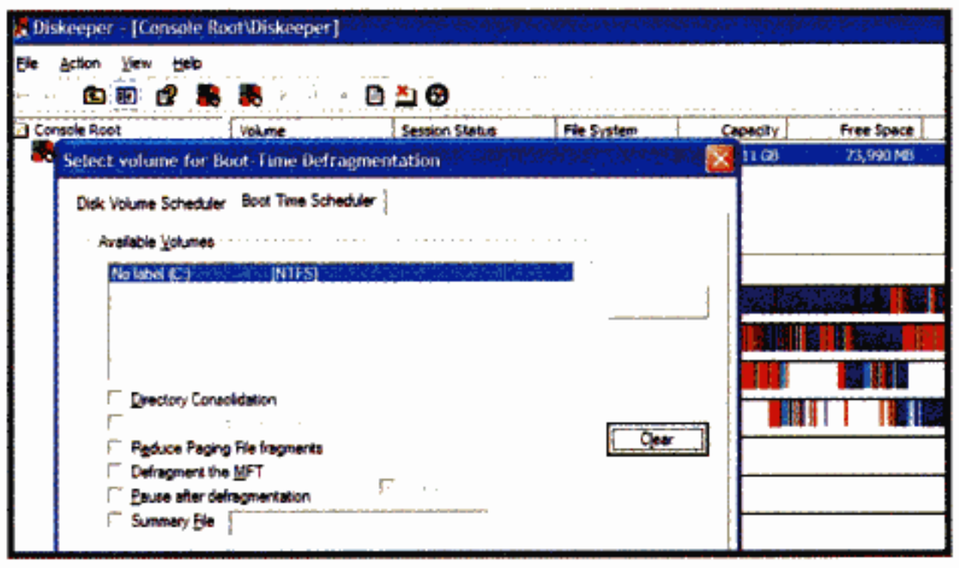
It's Hot! Damn Hot! Hot Enough to Melt Stuff...

My rig is almost exactly the same as the rig the interns built for the budget dream machine ["Lean Machine," Sept. 2002]. My problem is that *Warcraft III* causes the computer to either reboot or freeze. I checked the temperature of the CPU and it's 117° F, and the RAM is 82° F. I also flashed my videocard's BIOS to the newest version. This is really beginning to bother me. What could be wrong?

—CAPTAIN CRAZY-NAME

We're going to assume that you've installed the latest version of the chipset driver for your motherboard before we tackle your problem. After all, every regular Doctor reader knows that out-of-date chipset drivers are the number one cause of system instability today.

It's difficult to diagnose a crashing problem via e-mail, but if you're running the latest chipset drivers, our best guess is that you have heat issues. We don't like any component in our PC running hotter than 120°F, and you're a little too close to that mark with your CPU. You should either cut back on overclocking or add another fan and call us in the morning.



The best way to completely defragment your Windows XP system is to grab a copy of *Diskeeper* and run the boot-time defragmentation option.

I Can't Get into My Display Options Control Panel. Help!

I can't get the display icon in the control panel to open. An error message appears, saying, "The system administrator has disabled the display option."

How did this happen? I'm logged on with administrator privileges. How do you enable or disable icons in the control panel?

—DWIGHT REYNOLDSON

This is a bizarre problem that the Doctor's never seen before. However, we did manage to come up with a solution for you that might work. We think you're running Windows 2000, since none of the XP machines we looked at had an option to disable, instead of

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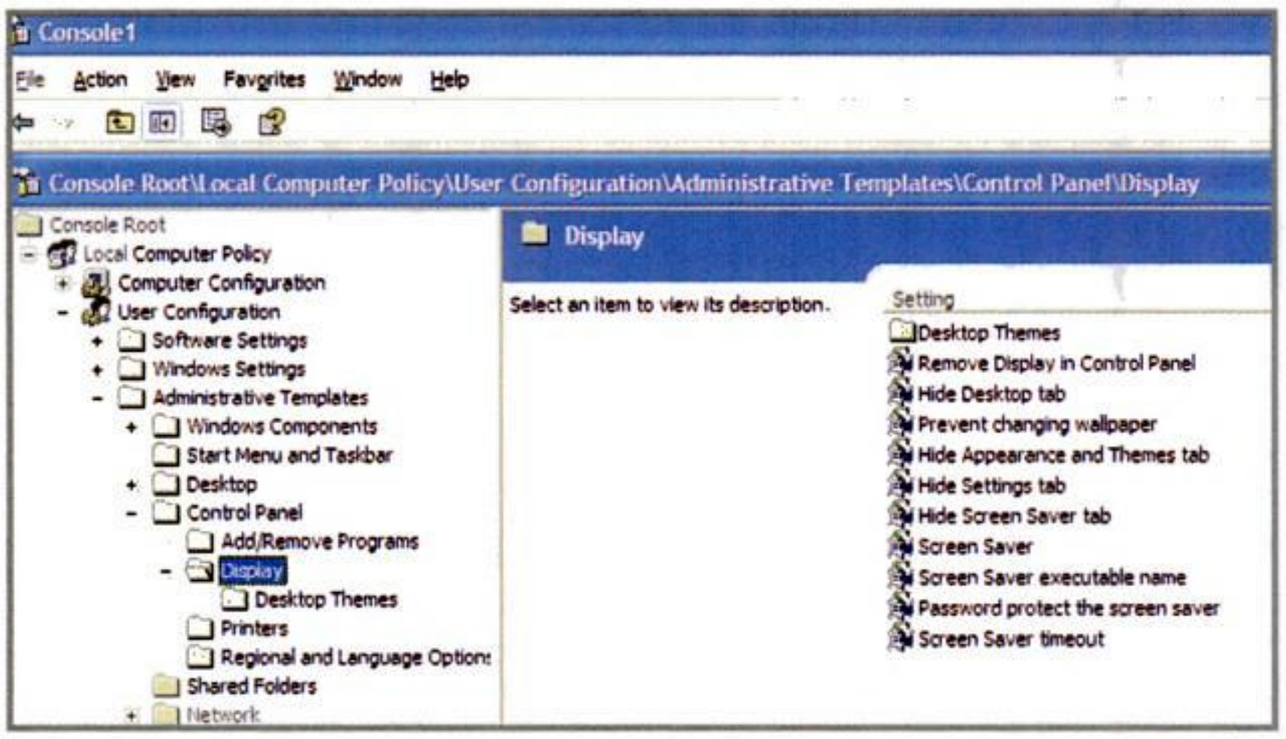

You can hide or even disable certain control panels using the Microsoft Management Console's many plug-ins.

just hide, the Display Control Panel.

To re-enable your Display Control Panel go to Start, then Run, then type `mmc.exe`. Then go to File, Add/Remove Snap-in, and click Add. Select the Group Policy snap-in and exit to the default MMC screen. Now, browse down to User Configuration\Administrative Templates\Control Panel\Display and change the setting of "Disable Display in Control Panel" to Not Configured.

That should fix your problem, but we're still not certain how you managed to do that by accident.

Netscape Doesn't Work Right? What a Surprise

I'm using *Netscape 4.79* as my browser. When surfing, I often get the following error message: "Netscape error... unknown status reply from server: 01!" The computer locks up until I click the OK button. How do I get rid of this error message?

—DICK SMITH

When we searched for your error on Google, we found about 148 pages that described some sort of esoteric bug in several popular web servers and different versions of *Netscape*, but couldn't find a solution. We recommend that you upgrade your browser to either *Internet Explorer 6* (www.microsoft.com/ie), *Mozilla 1.0* (www.mozilla.org), or *Netscape 7.0* (www.netscape.com). We also recommend that you keep your browser up to date, no matter which one you use.

If I Wanted to Select Cables, I'd Be Some Sort of Cable Selector Person

I've always wondered what Cable Select on IDE devices does. Is there any advantage or disadvantage to using it?

—JEFF

Instead of manually configuring drives as master or slave, Cable Select establishes the drive's status based on the drive's position on the cable. Most large companies like Dell prefer Cable Select because it simplifies the building and configuration of systems. Remember that if you intend to use Cable Select instead of manually configuring jumpers, you have to set all devices on the chain to Cable Select. Is there any reason for you to use it? Sure. It does make drive swaps easier. Even grizzled old PC veterans who set it manually will sometimes screw up and set both devices on a chain to master.

Linux Ate My PC... TWICE!

My machine has two hard drives, an 80GB and 40GB Western Digital. I had Win2000 and XP installed on the 80GB drive—it has two 40GB partitions. Then I divided the 40GB drive into two partitions, a 10GB and a 30GB, and installed Red Hat Linux 7.2 on the 30GB partition and used the 10GB for backups.

Near the end of the Linux install, I chose LILO as my boot manager. During the boot process, I was presented with the option to choose "Linux or DOS." If I choose Linux, I boot into Red Hat and everything is normal. However, if I choose DOS, the screen freezes and I can't boot into either 2000 or XP.

I went ahead and destroyed the Linux partition and formatted all the drives again and reinstalled 2000. Now I want to try and install Linux again, but I'm afraid the same thing will happen.

—HAMED M.

We've multi-booted systems with Windows 2000, XP, and Linux for a long time and the secret to our success is a little app called *BootPart*. Grab it at www.winimage.com/bootpart.htm. *BootPart* creates a small image file on your primary hard drive that tells the NT Bootloader how to load other operating systems.

To use *BootPart*, you'll want to install XP or 2000 on the primary partition—make sure it's formatted FAT16 or FAT32—of the first drive in your system, just like you've done. Then install Linux on another partition, and make sure you set LILO to install on the Linux partition, NOT in the MBR (Master Boot Record). Most Linux distros or liloconfig list this option as: "Superblock of the root linux partition."

After that's done, unzip the *BootPart* file that you downloaded to an easy-to-find directory—say, c:\bootpart\. Then open a command-line window and type `C:` then `cd \bootpart`. Then type `bootpart` to run the app, and make a note of the partitions it lists. You'll need to look at the list that *BootPart* generates—it should be listed as Ext2fs—and make a note of the partition number. Then type the following command line: `bootpart partition_number LBA linux [Linux]`

The next time you reboot your machine and select Linux, the NT Bootloader will look at the file that *BootPart* created and boot from your Linux partition. From there, LILO will take over.

Now, a Lesson in Using Google

Dell includes an application called *Default Application Monitor* (DAMon.exe) with all its new computers. My firewall indicates that this application frequently accesses the Internet. I can't find out from Dell what this application does, because nobody at Dell's tech support seems to know anything about it.

Does this application provide any benefit to the computer owner, or is it Dell spyware? Could you find out? I've been trying for months.

—TERRY SAPIO

Approximately 20 seconds after the Doctor read your question, a trip to Google yielded a partial answer. Damon.exe is an application that monitors your file associations and restores them when an unruly application overrides them. Why Dell is shipping PCs with the app preinstalled, we don't know. It's most likely running from a shortcut in the Startup group in your Programs menu. Just right-click that shortcut in your Start menu and delete it, and the program shouldn't run anymore.

FYI: Our contact at Dell has no idea what this program is, and assures us it's not installed on any Dell machines that are shipped from the factory, so someone else who has access to your machine must have installed it. ■

ATTENTION BAY AREA READERS!

Have a PC problem that you can't solve? Uncertain about the best way to upgrade your aging computer? We're looking for a few readers in the San Francisco Bay Area who are willing to bring their broken computers into our office for a day of troubleshooting and rebuilding that will be chronicled in the magazine. (We cannot pick up your computer or conduct off-site troubleshooting.) If you're interested, send an e-mail describing your problem and a detailed list of your current PC specs to clinic@maximumpc.com.

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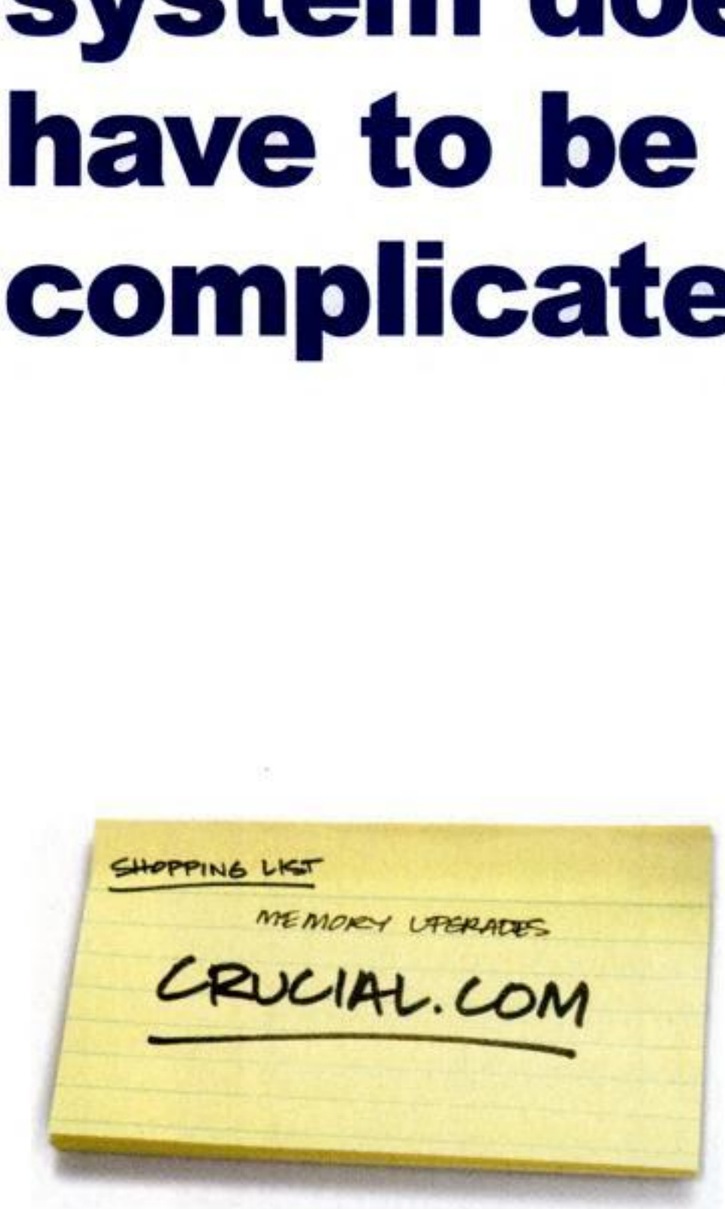

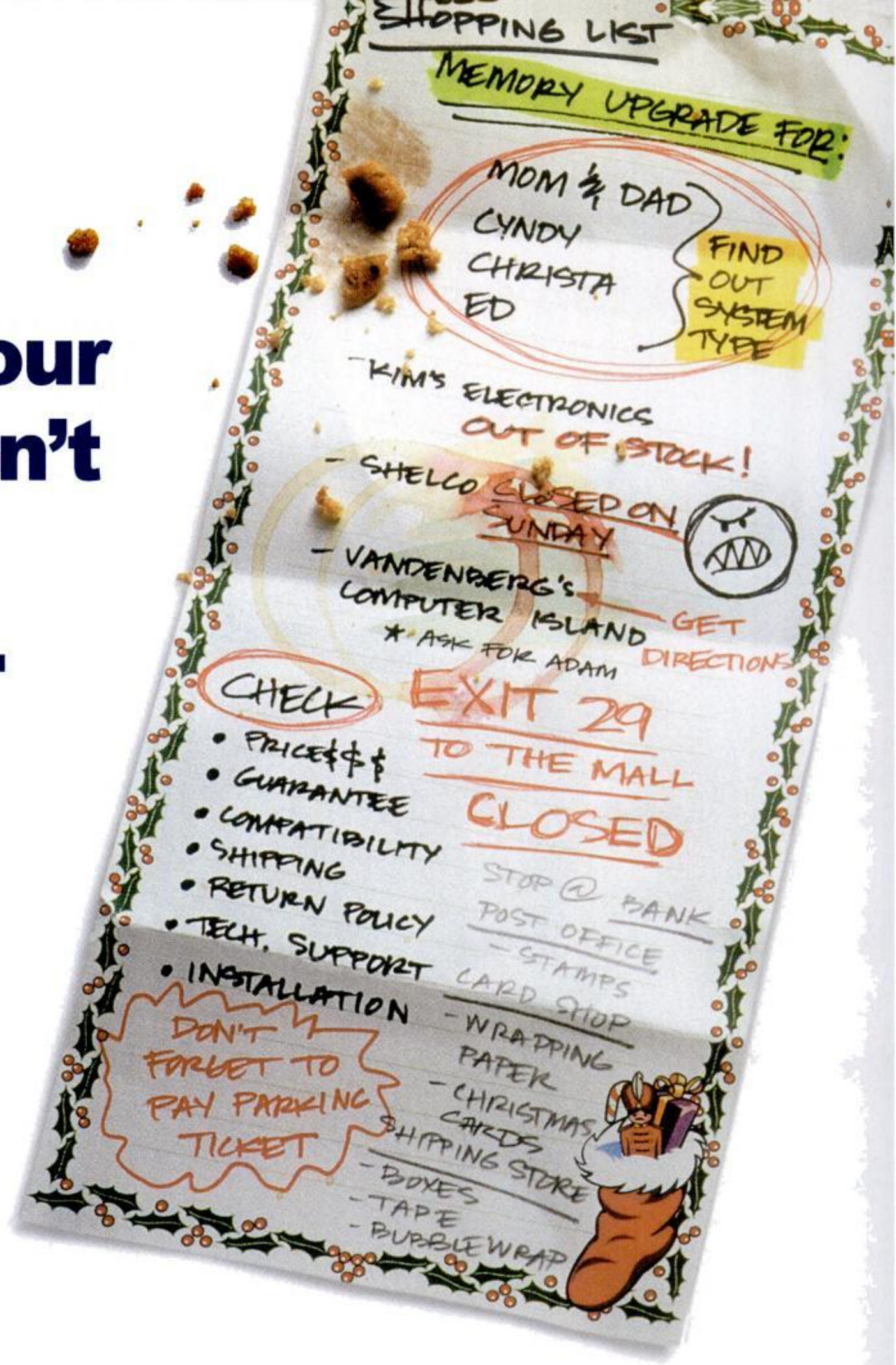

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How To...

A step-by-step guide to tweaking your PC Experience

PUT WINXP ON A DIET

Let's get rid of unnecessary start-up programs, services, and overall bloat

BY TOM MCNAMARA

If you haven't cleaned up Windows XP since you first installed it in 2001, it's probably ready for an overhaul. It's time to purge all the random files you've long forgotten, all the extraneous services you'll never use, and all the unnecessary Registry entries hiding in the depths of your machine. It's time to gather up all the muck and smite it in one single blow—a nice, quick alternative to the much more elaborate strategies outlined in our August 2002 "Clean Start" cover story.

MAXIMUMPC
TIME TO COMPLETION
00:43
HOURS MINUTES

This article is your hammer. Get ready to strike. When we're done, your copy of Windows XP will purr like a cheetah.

Take Advantage of Service Pack 1

After you install Service Pack 1, you can remove *Internet Explorer, MSN Messenger,* and a few other Microsoft programs that were previously embedded. To do so, go to Start>Control Panel>Add or Remove programs>Add/Remove Windows Components, uncheck the programs you want to remove, click "Next," and reboot to make the changes. Removing *Internet Explorer* will disable the automatic Windows Update service, but you can still access updates by going to **www.microsoft.com/windowsxp/security/default.asp.** Of course, you don't want to uninstall *Internet Explorer* if you don't have another Internet browser installed.

Not everyone needs the Microsoft apps that are automatically installed with the OS. Luckily, Service Pack 1 lets you remove the pesky embedded software that you don't want.

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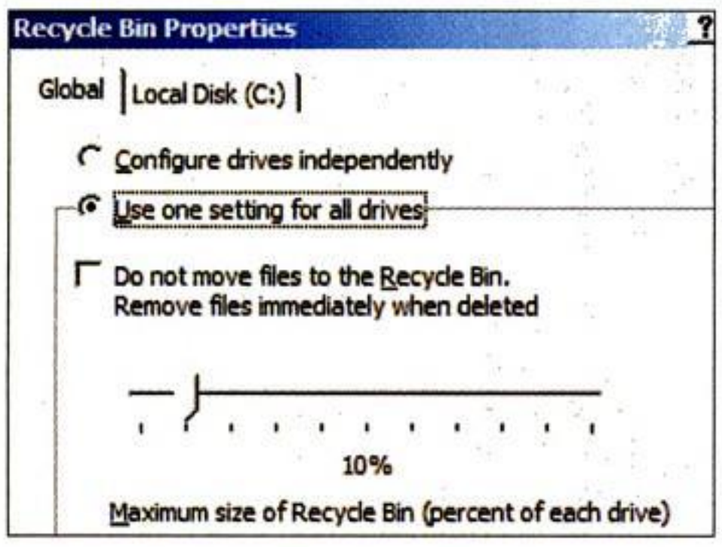
Resizing Your Caches

The *Internet Explorer* cache gets 2 to 3 percent of your hard drive by default. This small percentage adds up to more than 600MB on a 20GB drive and up to 3GB on a 100GB drive. Lower this setting by opening the browser and going to Tools>Internet Options and clicking the Settings button. 200MB is a good size, but 300MB is advisable if you have a dial-up modem or frequently visit sluggish sites.

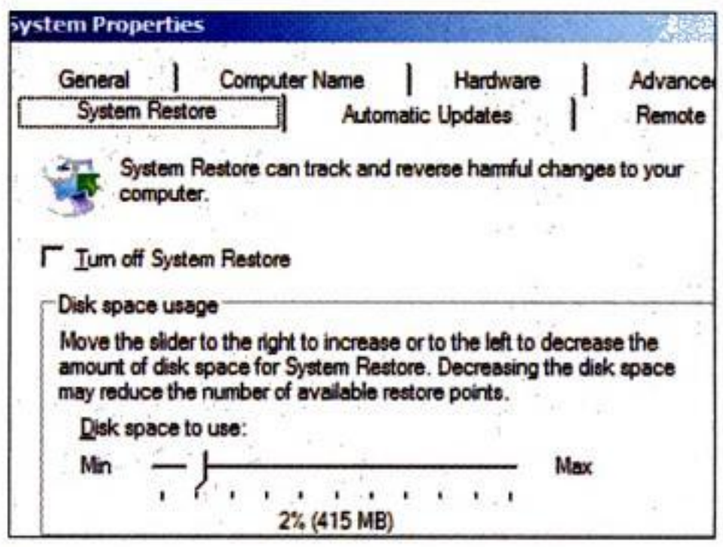
System Restore is next. Right-click My Computer, select Properties, and click the System Restore tab. System Restore uses around 12 percent of the drive, so adjusting to 1 percent can reclaim many gigabytes of space. It's advisable to leave at least 700 to 800MB for System Restore.

The Recycle Bin must also be addressed. The default setting is 10 percent—that's 10GB on a 100GB drive for you math whizzes. You can reclaim several gigabytes by moving the slider down. We recommend that you set the Recycle Bin to accept about 500MB maximum. Note that files larger than the size you choose will be permanently deleted.



By default the Recycle Bin eats 10 percent of your hard drive. That's a whopping 10GB on a 100GB drive. We recommend setting it to take either 500MB or 1 percent of your disk, whichever is larger.

You probably won't need more than 300MB of disk space to set aside as *Internet Explorer's* image and file cache.

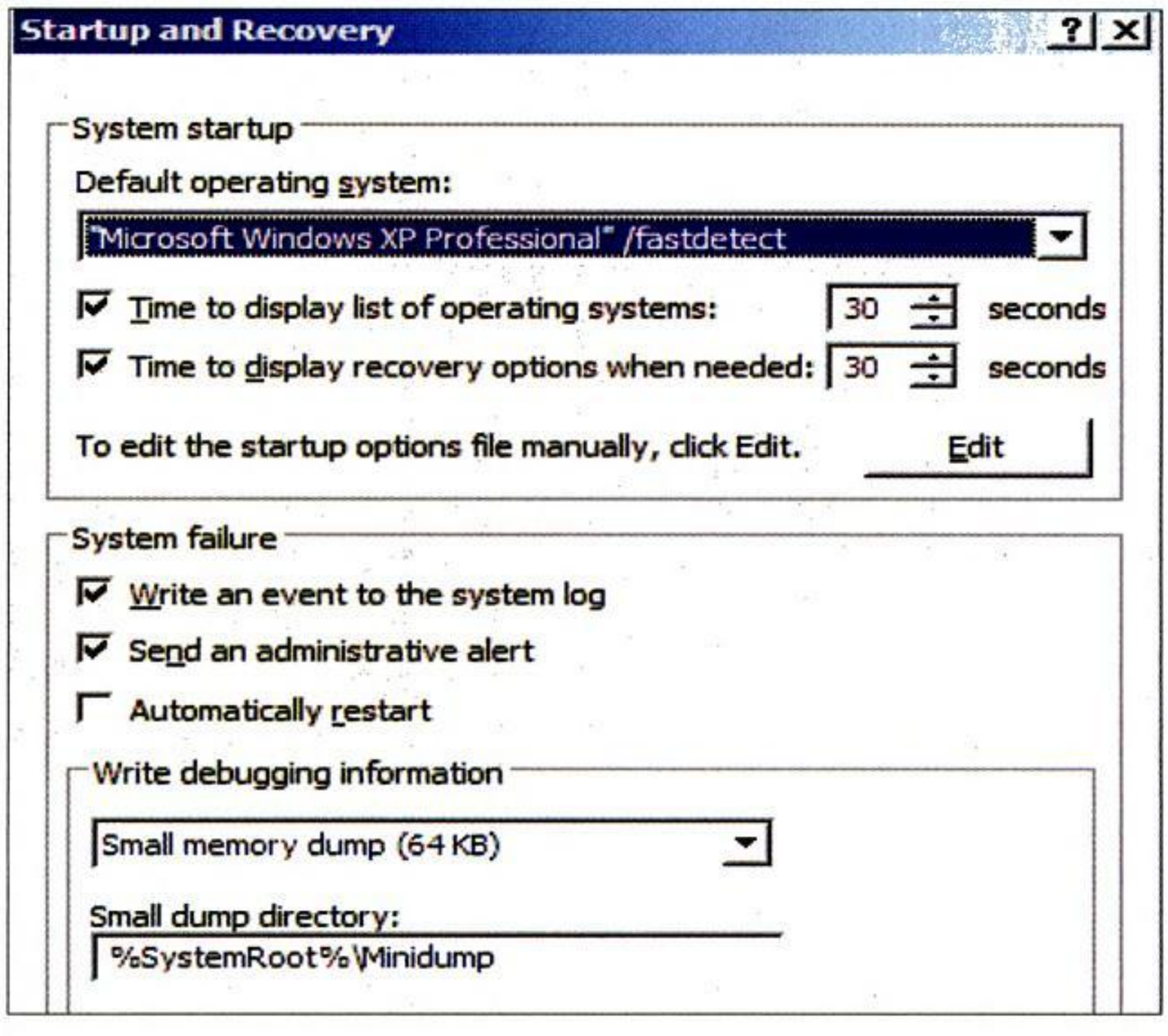


System Restore is almost as bad as the Recycle Bin for eating disk space. We recommend setting System Restore to use no more than 800MB of your hard drive.

System Failure Dumps and Lost Chains

Whenever your system crashes to a blue screen, it will write a small dump file, and this file can reach epic proportions if the OS isn't set up correctly. To make sure you've got it set right, right-click My Computer, select Properties, click the Advanced tab, and go to "Startup and Recovery." Now click Settings and go to the "Write debugging information" drop-down menu. The recommended setting for a home user is "Small memory dump (64 KB)." If this is set to "Complete memory dump," then you'll end up creating a file equal to the amount of RAM you have.

Disk checking programs will also leave behind files in the root directory if your disk has "lost chains" of data. Lost chains are files that have been deleted from the FAT, but haven't been fully deleted. Note that NTFS partitions don't have the lost chain problem. If you want to free up some disk space, it's safe to delete files with the CHK extension from your c: drive.



If you want to minimize the amount of disk space that Windows takes when it blue screens, set the debugging info to "Small Memory Dump."

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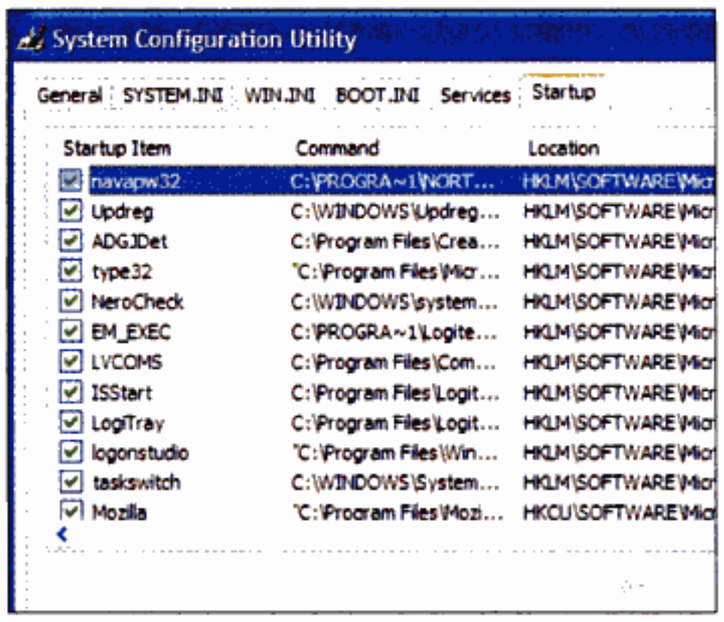
Nixing Annoying Start-Up Programs

After a while, a lot of programs will start showing up in your System Tray (the area near the clock) every time your computer starts. Those little apps can eat a lot of system memory, slow down your boot times, and just plain annoy you with their presence.

To disable or remove these items, go to Start, then Run, then type `msconfig` and press Enter. We recommend against using MSConfig to disable services, but you can use it to turn off pesky TSRs (terminate and stay resident programs) and other apps. At the Startup tab you'll see a list of every program that loads when you boot, along with the location of the startup files. *Winamp Agent,* for example, is unnecessary because the program loads automatically when you open an MP3 file. On faster computers—2GHz and speedier—the quick-start option for apps like *Mozilla* and *OpenOffice* aren't necessary because they load quickly anyway.

To stop automatic loading, either uncheck the box next to the app entry, or track down the parent application and disable the System Tray option from there. We recommend you disable only one app at a time. That way, when you're rebooting the computer to enable the changes, you'll have a much easier time tracking down problems in the event that something goes awry.



Instead of mucking about in the Registry, you can use MSconfig to disable just about anything that's set to run on your system at boot time.

Removing Unneeded Services

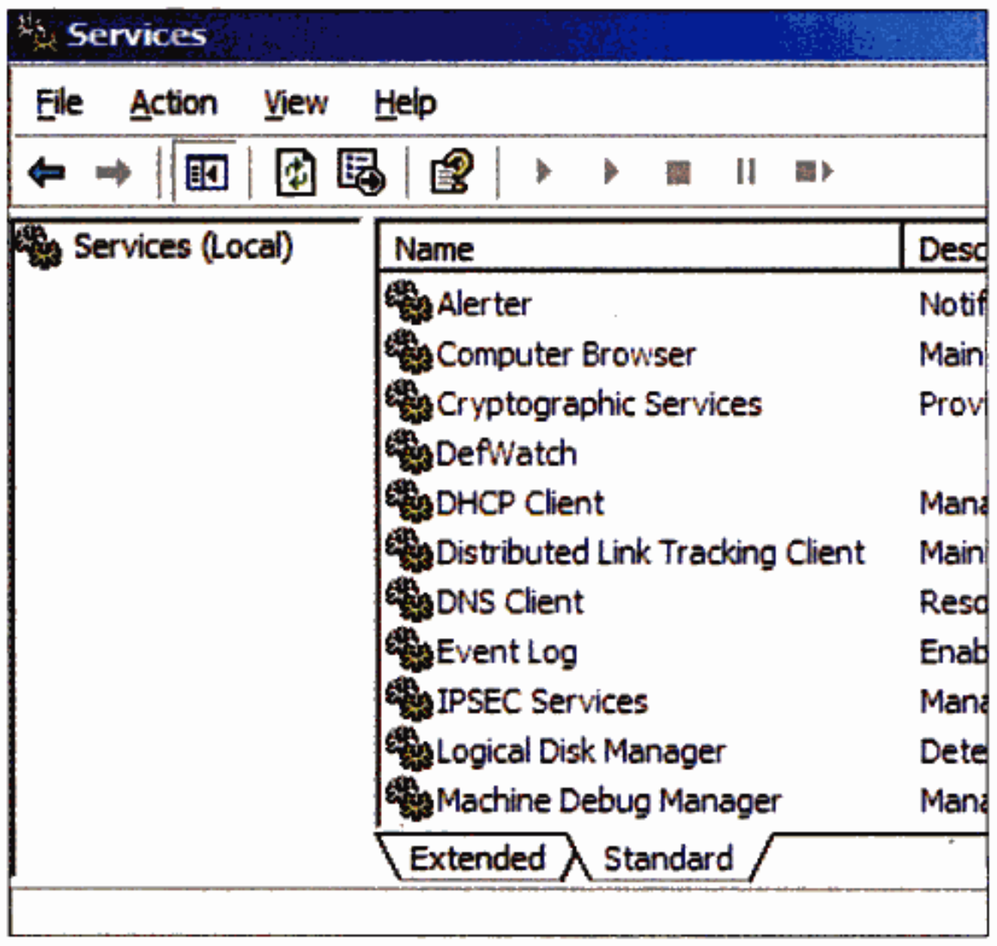
The default install of Windows XP Professional has more than 40 services running in the background. Check it out by going to Start, Control Panel, Administrative Tools, then click Services. Click the "Startup Type" column at the top for a list if all the currently running services. When you start disabling these services, do just one or two at a time, then reboot and make sure your PC is still working right. That will make troubleshooting significantly easier.

Now, right-click the Alerter service (which should be at the top) and select Properties. Here you can start or stop the service, set its startup mode, check to see what other services rely on it, and what services it depends on. There are also a couple tabs you won't need to worry about for this little project.

Here are the services that you can probably safely disable:

- Alerter is unnecessary if you're not connected to a corporate network or if you have a lone home computer.
- Com+ Event System and Com+ System Application are unnecessary if you don't have any programs in the ComPlus Applications directory in Program Files, which is usually the case.
- Computer Browser is necessary only if you have a home network and use file or printer sharing.
- The Error Reporting service is useful only for people who debug code.
- Network Location Awareness (NLA), Remote Registry, Portable Media Serial Number, System Event Notification, and Wireless Zero Configuration may not be necessary to a home user.
- The Wireless Zero, Portable Media, and NLA services are needed only when hooking up those devices to your computer or network. If you don't have a wireless LAN, an MP3 player, or a network, you can safely disable all three of those.

Disabling some of these services may bring up error notices in the Event Log, but that's most likely just Windows flapping its arms. However, if your system starts acting flaky, you should experiment with re-enabling some of the services. And don't forget to go back and stop the services you start, or else they may just keep running. A compendium of service information can be found at **www.blkviper.com.**



Instead of mucking about in the Registry, you can use MSconfig to disable just about anything that's set to run on your system at boot time.

Leftover Program Files

Sometimes programs will leave files and directories on the hard drive even after they've been uninstalled. To remove these files, browse to c:\Program Files\ and look for directories named for apps that are no longer on your system. Frequently the uninstall routine will leave files that have been added to the app directory or changed after the install. That will cause the entire directory to stay behind too. Before you delete these directories, you should browse through them and make sure there aren't any files you need to hang onto to. ■

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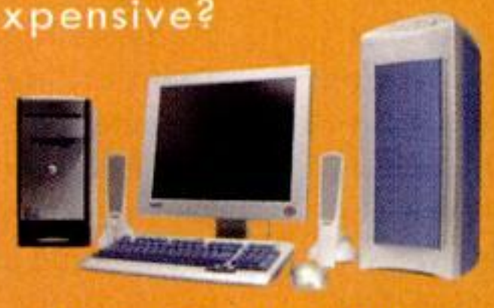

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In the Lab

A behind-the-scenes look at Maximum PC testing

Old Benchmarks, New Components

Let's take a trip down memory lane, and run some old performance tests on today's fastest hardware

During a staff movie night, we were inspired by the premise of *The Final Count Down*. In the film, Kirk Douglas, Martin Sheen, and a nuclear-powered aircraft carrier are sent back in time to battle the Japanese at Pearl Harbor. The movie portrayed a suspenseful showdown of 1990s' high-tech vs. 1940s' yester-tech, and got us to wondering what would happen if we tried the same thing, except with PCs.

Now, as luck would have it, there was a DeLorean sitting in our parking lot, but the guy who owns it wouldn't give us the keys. So to travel through time, we did the next best thing: We built a superfast modern PC, and loaded it with Windows 95 and a bunch of dusty, old benchmarks.

Would modern computing power give us insanely highs scores? Would modern computing power break the old-school benchmarks entirely? That's what we intended to find out. Our test rig was based on a 2.53GHz Pentium 4, an Intel D850EMV2 mobo, 512MB of PC1066 RDRAM, a Western Digital 1200JB hard drive, and a GeForce4 Ti 4600 card.

To make our config work properly, we passed on the retail version of Windows 95, and went instead with the OSR2 OEM version, which supports AGP. Then we hit an unusual snag: The OS doesn't run on 1GHz or faster machines without an AMD K6-2 update, of all things. Issues with Win95 also forced us to use nVidia's WHQL release drivers, instead of the typical Detonator drivers. And like OS newbies, we also forgot to enable DMA support for our ATA/IDE drives until halfway through the tests, forcing us to start over again. Doh!

Only AT-case loving old-timers will remember running the Waite Group's *3DBench* on their Orchid Fahrenheit cards! Now that was the golden age of 3D.

With our Win95 machine finally up and running, we loaded our old *bootMark* test, which we retired in November 2000. The test uses simple (and outdated) Whetstone and Dhrystone integer tests to measure rudimentary CPU performance, and is anything but a real-world evaluator. Regardless, in December 1997, a 300MHz Pentium II rig with 32MB of EDO memory *bootMarked* at a "scary" 145—equal to Dream Machine 97's score. Wow. Our Time Machine 2002 gave us a little more performance, pegging 888.5.

The same 300MHz P-II rig from 1997 gave up a score of 126 in the MDK *PerfTest* DirectX-gaming benchmark. Meanwhile, our Time Machine hit 1,250. Woo haw! We also ran the *ForsakenMark*, which was our D3D test for many moons. A 450MHz P-II rig armed with a Riva 128 videocard hit 209fps. Nice, but Time Machine 2002 mustered 846fps.

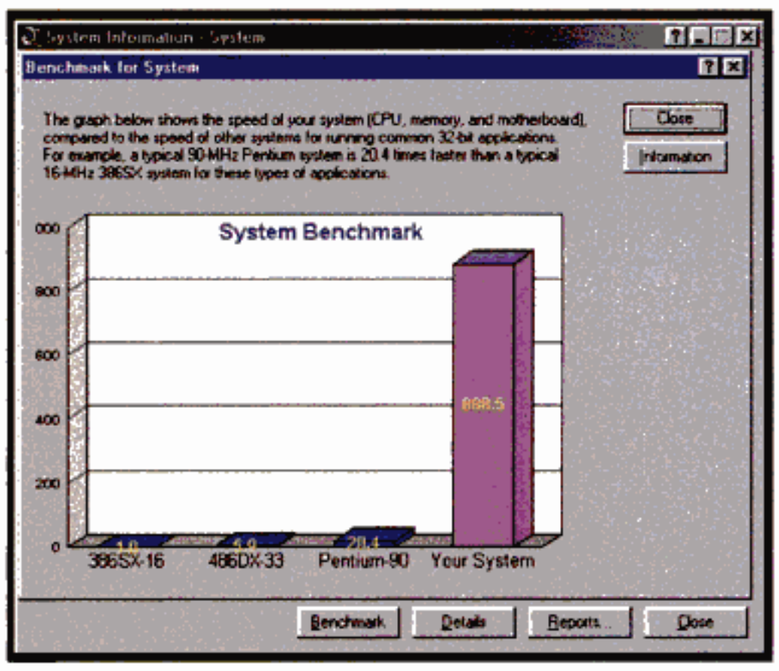
Given the recent controversy surrounding BAPCO's *SYSmark* tests, we really wanted to see how our modern P4 would handle the golden oldie *SYSmark98*. In November 1998, a Kick Ass–rated Dell machine running a 450MHz Pentium II scored 185 in *SYSmark98* (and 209 in *bootMark*, for that matter). Time Machine 2002 scored 578 in the long-forgotten BAPCO test.

We also reached back further into the past for some DOS benchmarks. The classic *Landmark System Speed Test 2.0* indicated that Time Machine 2002 had a 27GHz CPU in it. Cute, very cute. And the Waite Group's *3DBench*? It reached 223fps, for those of you who still remember the test.

Now, at this point, some of you may think that a modern rig should score even higher benchmark numbers. But just remember that some of these tests have ceilings. In MDK's *PerfTest*, for example, the Time Machine scored 1,250. Then we fired up two DOS benchmarks in the background to soak up CPU cycles, and we still got 1,250. Like a speedometer that tops out at 85mph even when the car is pushing 100mph, some of the old benchmarks just don't show any higher scores.

Other scores were most certainly affected by our drivers or overall parts configuration. For example, Time Machine 2002 broke the 300fps barrier while running *Quake III* at 640x480. *Quake II*, however, topped out in the 150fps range on the same machine. We also weren't impressed with our *3DMark 99* scores. A Celeron 500MHz married to a Diamond Viper V550 scored 2,931, while Time Machine 2002 hit just 8,869.

That's just about 3x performance—pathetic!



Ahh, the *bootMark*. Dream Machine 97, which boasted a 300MHz Pentium II, reached a score of 145 in this test. In November 2000, when we retired the rudimentary integer-performance benchmark from our official testing suite, a 1GHz Athlon system reached 547. In this chart, you see the outrageous score mustered by a 2.53GHz Pentium 4 system.

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EluminX Illuminated Keyboard

If you've ever found yourself computing in the dark and hunting for the F4 key in the middle of a game, check out the EluminX keyboard. Using an electroluminescent technology similar to Indiglo (used in watches and car gauges), the keyboard makes night-time computing easier. And fun too!

Sure, the unit is a bit of a light-weight, and you certainly wouldn't want to pound on it the way you would a Key Tronic, but the illumination is bright and even, and the whole device is powered by your PS/2 port. Considering the prices that other illuminated keyboards run, the EluminX is a deal, and perfect for people whose PCs resemble a Lite-Brite set. The current version of the EluminX is available in aquamarine with PS/2 support, and the company has plans for USB versions and other colors. Fun factoid: Compaq holds one patent on backlit-keyboards; EluminX holds another.

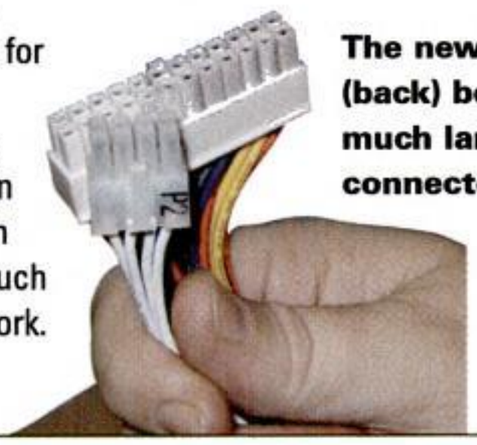
$100; www.eluminx.com

A New Spike in the Power Scene

As indicated in our preview on page 85, Iwill's new P4GB motherboard will use Intel's 7205 chipset (aka "Granite Bay"), a dual-channel DDR chipset intended for workstations. Also take note that we couldn't test the mobo using a standard ATX12V power supply, and instead had to secure an EPS12V power supply. Confused? It's not your fault: The EPS12V is part of a new spec called Server System Infrastructure (SSI).

SSI aims to standardize entry-level server and workstation hardware much like ATX did for desktop parts. EPS12V power supplies use a different wiring harness than ATX12V power supplies. The EPS12V spec also calls for dual-speed fans and the ability to automatically switch PSU voltage between 110 volts and 220 volts. Intel is one of the main promoters of SSI, which essentially supercedes the WTX workstation specs.

Does buying an EPS12V power supply make sense for *Maximum PC* readers? Probably not, as Intel and AMD desktop motherboards won't use it. But the big question is whether motherboard vendors can design desktop-level, ATX12V-compatible mobos armed with Granite Bay. We know board vendors are planning such designs, but it remains to be seen how well they'll work.



The new PSU (back) boasts much larger connectors.

Best of the Best

As of December, 2002

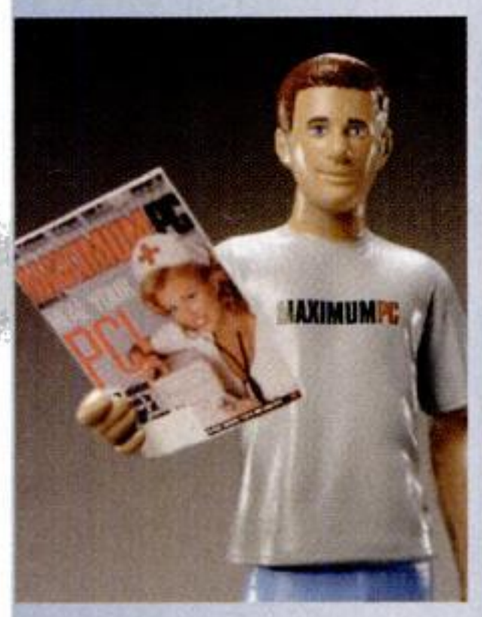
Here are our current top picks for each hardware category. Red text indicates first month on chart. Check back next month for updates.

High-end videocard:
ATI Radeon 9700 Pro
Budget videocard:
Gainward GeForce4 Powerpack! Ultra/650XP Golden Sample (GeForce Ti 4200)
Do-everything videocard:
All-In-Wonder Radeon 8500DV
Soundcard:
Sound Blaster Audigy 2 Platinum
Hard drive:
Western Digital 1200JB
CD-RW drive:
Plextor PXW4824TA/BPS
LCD monitor:
Sharp LL-1820
CRT monitor:
Sony F520
P4 motherboard:
Asus P4T533-C
Athlon XP motherboard:
Asus A7V333
Portable MP3 player:
iPod 20GB
Photo printer:
Epson Stylus Photo 1280
Pocket PC PDA:
Toshiba e740
5.1 speakers:
Logitech Z-680
4.1 speakers:
Logitech Z-560
2.1 speakers:
Klipsch Promedia 2.1

Our current gaming favorites: *No One Lives Forever 2, Mafia, Battlefield 1942, Cribbage*

Dear Rachel

Boy meets girl, boy e-mails girl, girl gets restraining order



"My dearest Rachel: A more fetching lass, I have never seen. It is thus with utmost humility that I send this communiqué, requesting a tête-à-tête so that we may begin courtship in earnest. Dost thou deem me worthy? Your most humble love servant, Timmy Masters."

"Listen, dude, I don't know who you are, or how you got my e-mail address, but if you write me again, I'll call the police. Plus, I'm five-ten, and you're just six inches tall. Do the math."

"Ma cherie: It would appear that I have upset you, so I most respectfully apologize for the intrusion. I, of course, respect your wishes, but would like to invite you to a game of *UT* at 2200 hours. My frags will be wholly platonic, I assure you."

"I don't know what kind of sicko scheme you have brewing, but if you don't leave me alone, I'll get medievil on your ass with a pair of pliers and a blow-torch. Hear me talking, plastic boy?"

"*Counter-Strike*, perhaps?"

"No."

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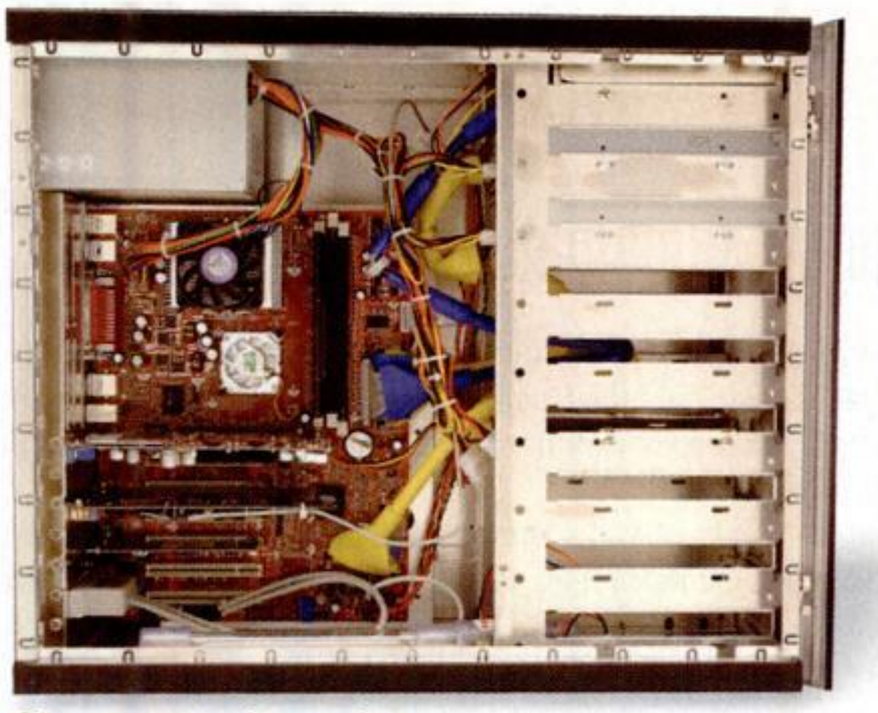
iBuypower NightDreamer XP

Lean, mean, and exotic—but not a world-class screamer



Cheap power in spades.

We've had vendors use our Dream Machines as configuration templates before, but we've never had any build a PC in the likeness of one of our *budget* creations. It seems, however, that iBuypower might have used this year's Lean Machine (September 2002) as the inspiration for its NightDreamer XP. Just an egocentric hunch, but there are indeed a few striking similarities.

Witness the 333MHz system bus. Witness the "jumbo cache" version Western Digital hard drive. Witness the 512MB of Corsair-branded RAM. And like the Lean Machine, the XDreamer is inexpensive. With speakers and a 19-inch monitor, it runs just about $900 more than our Lean Machine (which included neither peripheral).

But the NightDreamer XP isn't a high-strung overclocked jobbie like our budget creation. It uses a stock-clocked AthlonXP 2700 ticking along at 2.17GHz on a 166MHz double-pumped system bus, care of MSI's KT4 Ultra motherboard. The motherboard features a Serial ATA controller, but the XDreamer doesn't make use of it. The DVD-ROM drive is a Lite-On, and the 40/12/48 CD-R drive is made by newcomer Artec.

The NightDreamer XP also eschews the overclocked GeForce4 Ti 4200 we used in favor of an ATI Radeon 9700 running at AGP 8x—a decision that costs a pretty penny. But the big news, of course, is the rig's Athlon XP 2700+. AMD fanatics are already working themselves into a frenzy over the improved Athlon XP. No, not because the 2700+ is AMD's penultimate performer, but because the chips aren't available anywhere! Well, it turns out you *can* buy the chips—from system vendors, inside a case, and bundled with a full complement of PC components.

Compared with the 2200+ (1.8GHz/266GHz) Compaq machine we reviewed in August, the NightDreamer XP yielded about 19 percent more performance in *SYSmark2002*. But even with a *SYSmark2002* score of 214, the rig can't compare with systems running 2.53GHz P4s, much less 2.8GHz P4s (we've seen the fastest P4s hit 268 in this benchmark).

Digital audio extraction? The NightDreamer XP was a tad slow. The rig's Artec drive was about 10 percent behind the Lite-On 32x used in our zero-point system. Adobe *Premiere 6.0*? The NightDreamer XP was awesomely fast. No surprise there, because the Athlon XP owns this benchmark. In fact, the NightDreamer XP rendered our MPEG-2 movie in almost half the time of the Compaq from the August issue (which itself left most P4 machines shamefaced). Gaming scores were top-notch, thanks to the ATI Radeon 9700 Pro card, but fell just short of the fastest P4 boxes.

The entire PC is wrapped in a black aluminum Raidtronics SRC-A08 case—very impressive. The SRC-A08 lets you install up to eight devices in the front bays, and all in all, it's a refreshing change from usual-suspect enclosures. That said, we must note that the walls are a little thin, and inserting a CD-ROM in one of the drives caused the case to rattle a bit. You also pay a price for all your expansion opportunities: Because the slots are sized for 5.25-inch devices, you'll need to use a drive adapter for your 3.5-inch drives.

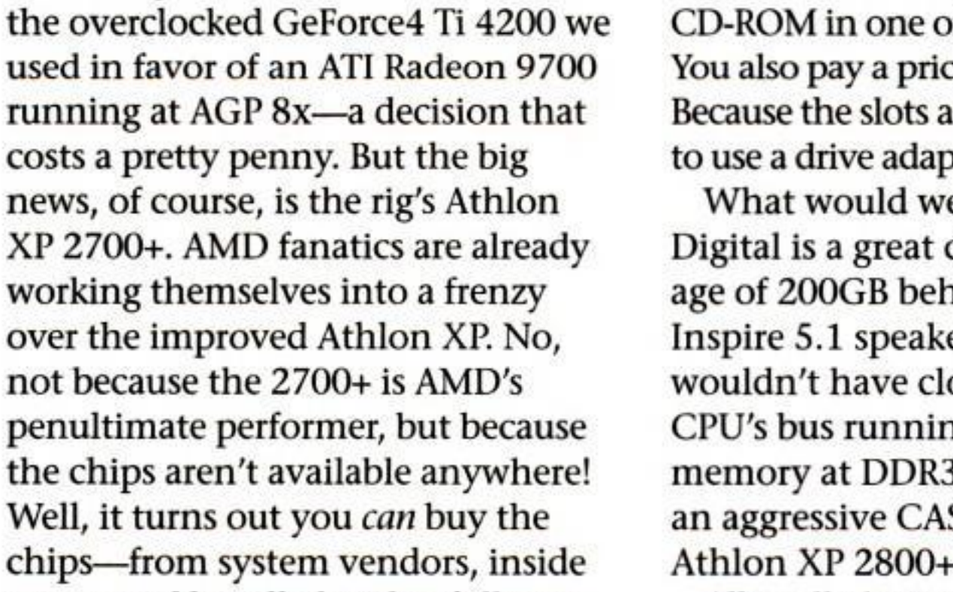
What would we change? Well, while the 80GB Western Digital is a great drive, a mere 80GB seems quaint in this age of 200GB behemoths. The speakers are Creative Labs Inspire 5.1 speakers—but, hey, no one's perfect. And we wouldn't have clocked the RAM at DDR400. With the CPU's bus running at DDR333, we'd prefer to run the memory at DDR333 rates, but with the RAM notched to an aggressive CAS2 setting (just like Voodoo did for its Athlon XP 2800+ reference box).

All in all, the NightDreamer XP is a solid machine that provides good performance at a fair price. It's just not one of the fastest machines on the market.

—GORDON MAH UNG

UNDER THE HOOD

THE BRAINS	
CPU	Athlon XP 2700+ (2.17GHz)
Mobo	MSI KT400 Ultra
RAM	512MB PC3200 (DDR400) Corsair
I/O ports	Five USB, PS/2 mouse, PS/2 keyboard, parallel port, two serial ports, mic input, VGA, DVI
NETWORKING	
LAN	RealTek Fast Ethernet
DISPLAY	
Videocard	ATI Radeon 9700 Pro
Monitor	ViewSonic E90FB 18-inch viewable
STORAGE	
Hard drive	80GB Western Digital WD800JB (8MB cache)
DVD-ROM	Lite-On 16x DVD-ROM
CD/RW	Artec 40/12/48
AUDIO	
Soundcard	Sound Blaster Audigy
Speakers	Creative Labs Inspire 5.1 5300
FINE DETAILS	
Case	Raidtronics SRC-A08
Fans/extras	Two 80mm fans, sound activated neon light
Mouse	Microsoft Intellimouse Explorer 3.0A USB
Keyboard	Mitsuko PS/2
BUNDLE	
Windows XP Professional, Ahead *Nero Burning ROM*	
BOOT: 55 sec.	**DOWN: 13 sec.**



Our zero-point system includes: an Intel D850MV motherboard, a 2GHz P4 CPU, 512MB PC800 RDRAM, a GeForce4 Ti 4600 videocard, and a Western Digital 1000BB hard drive (2MB cache).

MAXIMUMPC VERDICT

NightDreamer XP
ALIENWARE

+ DINTY MOORE

Athlon XP with a 333MHz system bus!

– DUDLEY MOORE

Just 80GB of storage, uninspiring speakers, and less-than-world-class performance.

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$1,900 ($1,648 w/o monitor and speakers)

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WILLIAM O'NEAL
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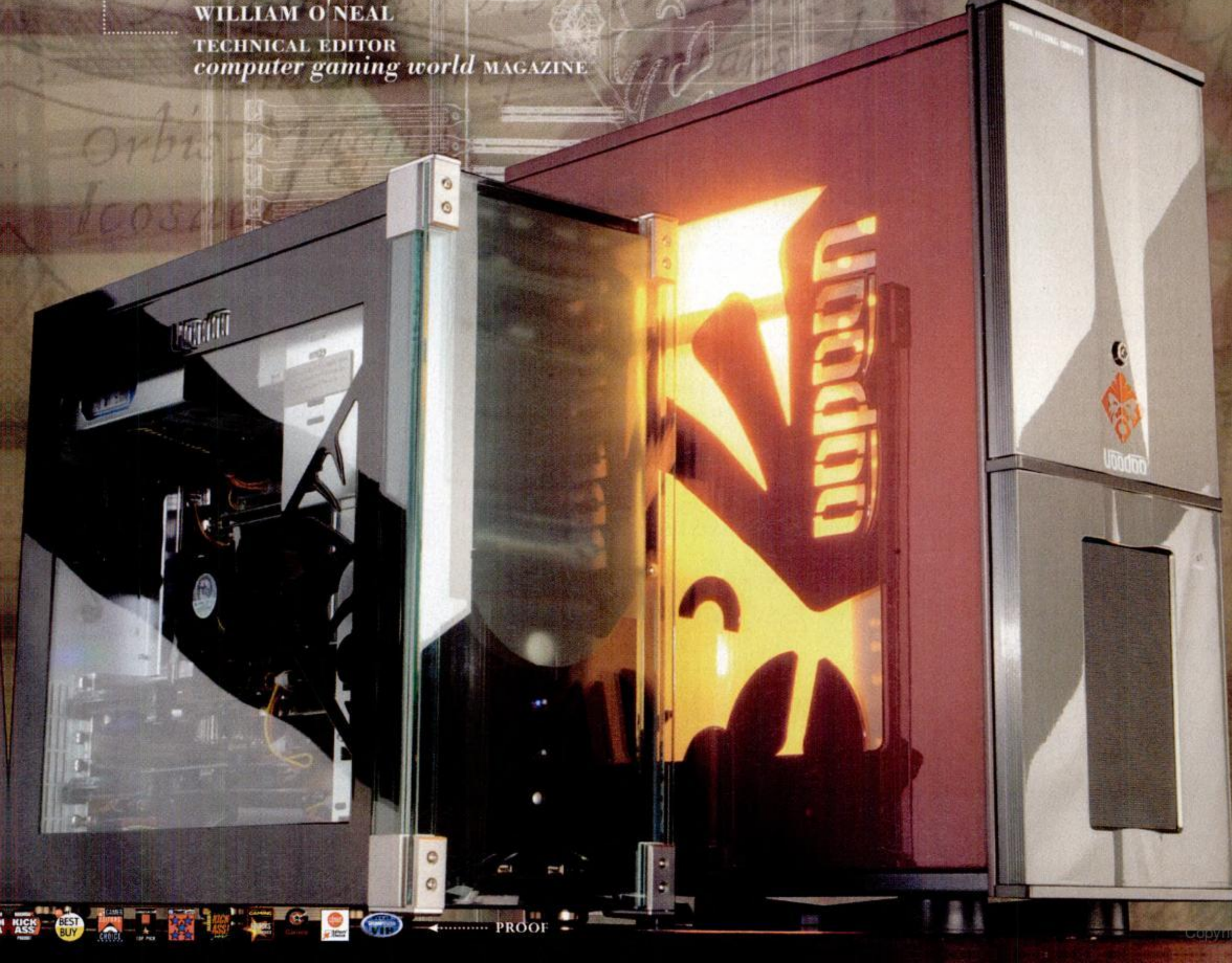
computer gaming world MAGAZINE



PROOF

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Adamant Gamer's Dream 6030

High performance—but a bit too high-strung

A stunning black Enermax case houses the Dream's premium parts.

Made of top pedigree parts and wrapped in a dark, rich coat, the Adamant Gamer's Dream is a black beauty to behold. The Dream sports a 2.8GHz P4, a Radeon 9700 Pro, and 512MB of sweet RIMM4200 RDRAM (two 32-bit RIMMs—the first 32-bit RDRAM modules we've ever received from an OEM). All of this propelled the Dream to some of the best benchmark scores we've ever recorded. Unfortunately, we had so many problems getting a working system in the Lab, we just can't give this stallion unconditional praise.

At the starter gun, the 2.8GHz P4 blew through the CPU-intensive *Jedi Outcast* test at 72.4fps, and ATI's Radeon 9700 carried the Dream to 73.5fps in *3DMark2001*. Those scores are enough to make any gaming jockey smile. Rounding the turn, the Dream hit its stride, pulling down 285 points in *SYSmark2002*, our overall system performance test. For comparison's sake, consider that last month's 2.8GHz P4/DDR Micron scored a paltry 256 in *SYSmark2002* and 59.5fps in *Jedi Outcast*—it's hard to believe that both rigs run the same CPU.

In the Athlon-dominated *Premiere* test, the Dream's RAID array (based on two 8MB cache Western Digital drives) helped push the P4 to finish our script in 384 seconds—the best for any P4-based machine we've tested. And the Dream's 48x Lite-On CD-RW drive finished our *Audiograbber* rips in merely 135 seconds. The *MusicMatch* conversion test? A scant 161 seconds—the fastest we've ever recorded. Breaking record after record, the Dream is the speediest box we've ever reviewed.

The beauty behind the Adamant's race-horse performance is an all-aluminum Enermax case. It's glossy black all over, with matching bezels, and a vented case window. The interior is lit up with a neon Antec power supply, and a neoned 80mm fan. Keeping the 80mm fan company are two 120mm fans, and two 60mm fans. Still, the rig manages to operate silently thanks to its variable-speed fan controllers (also known as rheostats).

Minor gripes? Lose the lame-ass 60mm fans. They don't push any air compared with the 120mm fans in the window, and only add to the noise factor. And what's with the pre-installed full craplet suite from Creative Labs? One argument says that if you want access to the Creative remote control, at least some of the software needs to be installed. But we don't know a single geek worth his weight in heatsinks who would run more than just the Creative drivers.

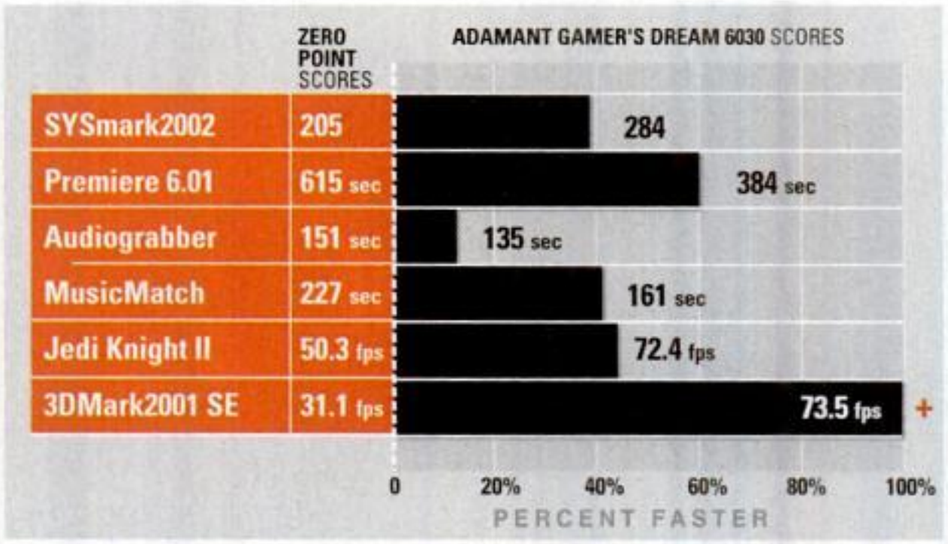
As for major gripes, we've got a big one. Prior to getting our final review machine from Adamant, we received no fewer than two other identically configured Gamer's Dreams that were either uncharacteristically slow or terribly unstable. Both machines had loose parts rattling around their insides when we unpacked them (a problem with shipping, perhaps?), and the config's P4T533 motherboard does have a reputation for being uppity. But conspiracy theories aside, it's hard to accept the statistical likelihood of receiving two screwed up rigs, and then a third and final box that suffered spontaneous reboots and crashes to Windows during *3DMark 2001* testing.

The final box was hand-delivered by Adamant's president, who stood over our shoulders during benchmarking, ready to troubleshoot if necessary. The need did arise when a mysterious *3DMark2001/SYSmark2002* conflict required a clean OS install. After that, the box ran well, but unless Adamant is willing to offer door-to-door delivery (to ensure parts protection) and in-home tech support (to settle software conflicts), we're not comfortable recommending this high-strung config to anyone.

—BRIAN LAM

UNDER THE HOOD

THE BRAINS	
CPU	Intel Pentium 4 2.8GHz
Mobo	ASUS P4T533-R
RAM	256MB Samsung PC4200 1066MHz RDRAM
I/O ports	Five USB, PS/2 mouse, PS/2 keyboard, parallel port, two serial ports, mic input, VGA, DVI, and Creative LiveDrive! with FireWire
NETWORKING	
LAN	Intel Pro/1000 T
DISPLAY	
Videocard	ATI Radeon 9700 Pro
STORAGE	
Hard drives	Two 120GB Western Digital WD1200JB (8MB cache)
DVD-ROM	Toshiba 16x PC-DVD
CD-RW	Lite-On 48/12/48
SOUND	
Soundcard	Sound Blaster Audigy Platinum
FINE DETAILS	
Case	Enermax 5190-01 Black with Antec True Blue 480W power supply
Fans/extras	One 80mm fan, two 60mm fans, two 120mm fans
BUNDLE	
Windows XP, Office Professional, Ahead *Nero Burning ROM*	
BOOT: 51 sec.	**DOWN: 7 sec.**



*Our zero-point system includes: an Intel D850MV motherboard, a 2GHz P4 CPU, 512MB PC800 RDRAM, a GeForce4 Ti 4600 videocard, and a Western Digital **1000BB hard drive (2MB cache).***

MAXIMUMPC VERDICT

GAMER'S DREAM 6030 Series
ADAMANT

+ THE LONE RANGER AND SILVER
The fastest system we've reviewed yet.

– WILBUR AND MR. ED
Three attempts to get us a working box—and the last rig was still quirky!

www.adamant.com
$2,500 (w/o monitor and speakers)

7

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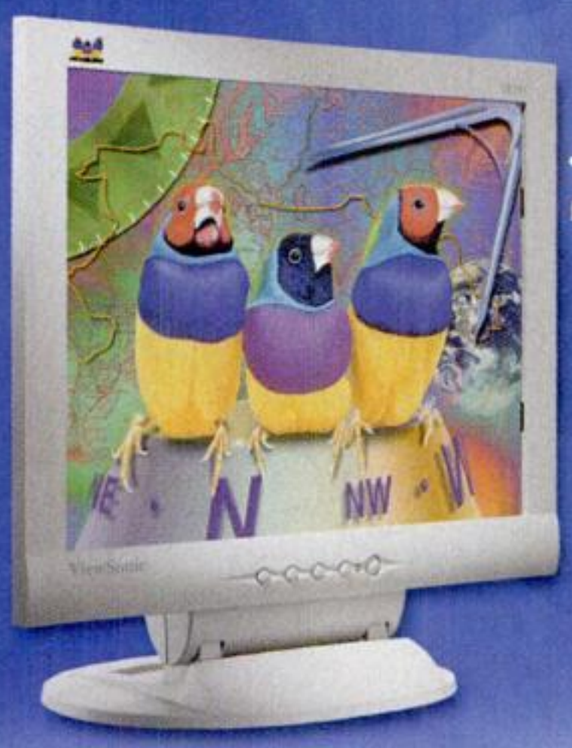
The Perfect Match For Any PC.



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VG700b 17" LCD. Today's systems are all about basic black, and ViewSonic® has just the displays to match. Priced right, the big 17" flat panel offers a high 450:1 contrast ratio with 260 nits of brightness plus a fast video response time for smear-free clarity for video and streaming media. Two 3-watt bezel-integrated speakers are great for gaming and multimedia applications. Or see other 17" LCDs; one is sure to be a perfect match:

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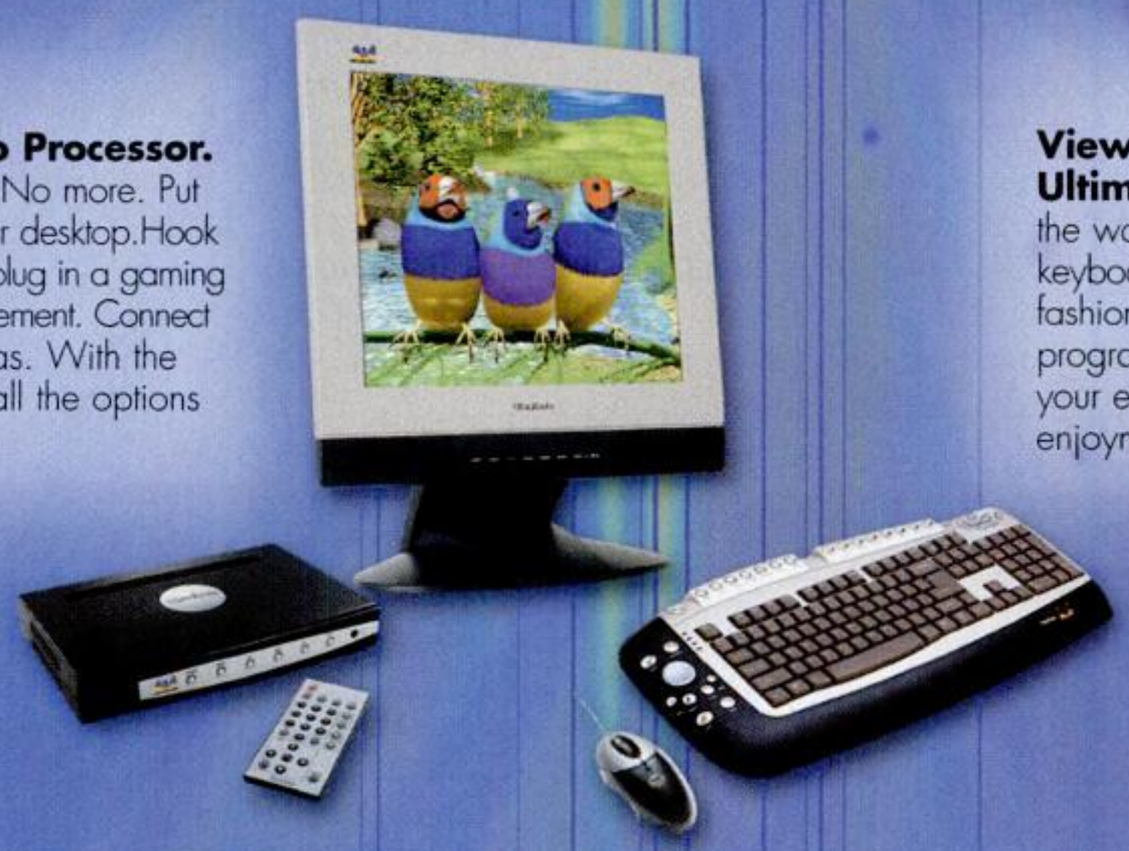

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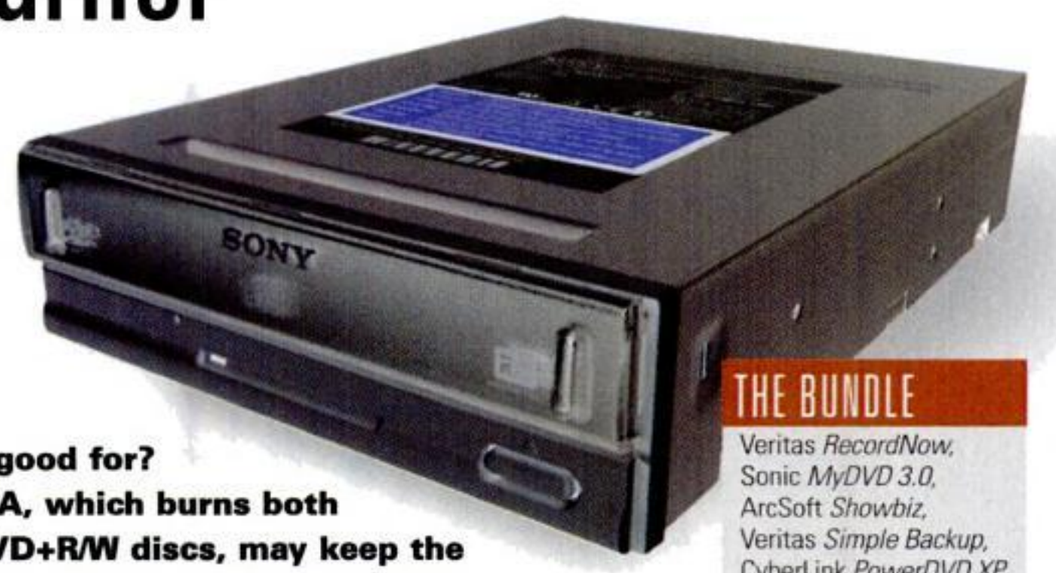
Sony's DRU-500A DVD/CD Burner

The drive with two brains!



War—what is it good for? Sony's DRU-500A, which burns both DVD-R/W and DVD+R/W discs, may keep the peace for this generation of DVD recordables.

THE BUNDLE

Veritas *RecordNow,* Sonic *MyDVD 3.0,* ArcSoft *Showbiz,* Veritas *Simple Backup,* CyberLink *PowerDVD XP,* *MusicMatch Jukebox*

ONE DRIVE, MANY FORMATS

Writes to:	DVD+R	2.4x
	DVD-R	4x
	CD-R	24x
Rewrites to:	DVD+RW	2.4x
	DVD-RW	2x
	CD-RW	10x
Reads:	DVD-ROM	8x
	CD-ROM	32x

In case you haven't heard this pathetic tale already, let's quickly recap what's happening with recordable DVDs: The two most popular consumer standards are DVD-R/W and DVD+R/W. DVD-R/W came out first and continues to be the market leader. Discs burned on DVD-R/W writers also tend to be more compatible across a wide breadth of DVD players hooked up to TV sets. DVD+R/W, on the other hand, boasts much more efficient random data access.

Unfortunately, just like Betamax and VHS, the two standards are incompatible with each other. And just like the two videotape standards, the two rewritable DVD standards are duking it out at the expense of consumers who just want a product that won't become obsolete a year down the road.

Enter the DRU-500A. Sony—which, by the way, suffered a major black eye with Betamax—is now bringing the two rewritable DVD standards together in one drive! For this gesture, the Sony engineers have earned our admiration. And for the hardware itself, they've earned a Kick Ass award (not to mention our Gear of the Year award—see page 26).

Let's blow through the benchmarks. Using the bundled *RecordNow* application, we burned a 647MB data CD at the DRU-500A's maximum speed of 24x. It took 4:27 (minutes:seconds), which is just slightly above average for 24x burners. CD-RW performance was similarly uneventful—it took 8:12 to record 647MB to a rewriteable disc. Digital audio extraction, however, was surprisingly sharp. It took 3:08 to rip a full 70-minute-plus CD, peaking at 31x and turning out perfect tracks.

DVD recording is where it's at, though, and the DRU-500A performs just as advertised. It writes and rewrites to both DVD formats, and burns discs with the highest compatibility levels possible today (see the chart below to find out how each DVD we burned fared in our compatibility tests). Sony also throws in Sonic's *MyDVD 4.0*, which can import digital video and burn it directly to DVD and even create simple menus from your edited clips. It's a ridiculously easy process. If you want to burn analog video to DVD, however, you'll still need to convert it to MPEG-2 with a separate application. Why this function isn't integrated, one can only guess.

We're a bit reluctant to give a Perfect 10 verdict to a product that could easily be improved with faster across-the-board write speeds, but our DVD recordable mantra has always been "compatibility" (with set-top players and PC-based DVD-ROM drives, that is). Until one standard prevails—or Blu-Ray technology takes over—this is the only drive that provides the best of both DVD recording standards for the price of one. We call it a breakthrough.

—LOGAN DECKER

MAXIMUMPC VERDICT

DRU-500A
SONY

+ 10012

Need we say it again? Sony layers the two major recordable DVD standards around a rich, creamy center.

– 90210

CD-R/W speeds remain well below the highest specs in their respective categories. Bundle omits software for encoding analog video to MPEG-2.

www.sonystyle.com
$350
10

DVD-PLAYER COMPATIBILITY	DVD+R	DVD+RW	DVD-R	DVD-RW
Toshiba MD-1502	Y	N	Y	N
Pioneer 115	Y	Y	Y	Y
Hitachi GD7500	Y	Y	Y	N
Samsung SN308B	Y	Y	Y	N
RCA Divx	Y	Y	Y	N
RC52312 (set-top)	Y	Y	Y	N
Sony RMSS300 (set-top)	Y	Y	Y	Y
Panasonic DVD-RV30 (set-top)	Y	N	Y	Y

This chart shows whether a DVD-video created with Sony's drive was able to play in various DVD-ROM drive and set-top players. All of the compatibility tests were performed using Verbatim media.

BENCHMARKS	DVD	CD
Average data transfer (MB/sec)	6.73	3.50
Random/full-stroke seek (ms)	184/273	50/240
Audio extraction (secs)	-	3:09
Data CD burn (min:secs)	-	4:27
Data DVD burn (min:sec)	24:02	-
CPU utilization (8x)	15%	9%

NOTE: The data CD burn test uses the bundled applications to create a 647MB CD-R using Verbatim media. The data DVD burn test uses the bundled applications to create a 4.25GB DVD with DVD-R 4x, the fastest data DVD standard supported by the DRU-500A. We used very new, prototype DVD-R media provided to us by Sony for this test, so its possible speeds could vary slightly if the media is tweaked further before mass production. The audio extraction test uses a commercially stamped 70:07 minute audio CD using Verbatim media.

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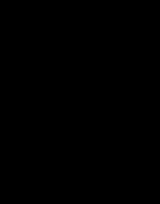

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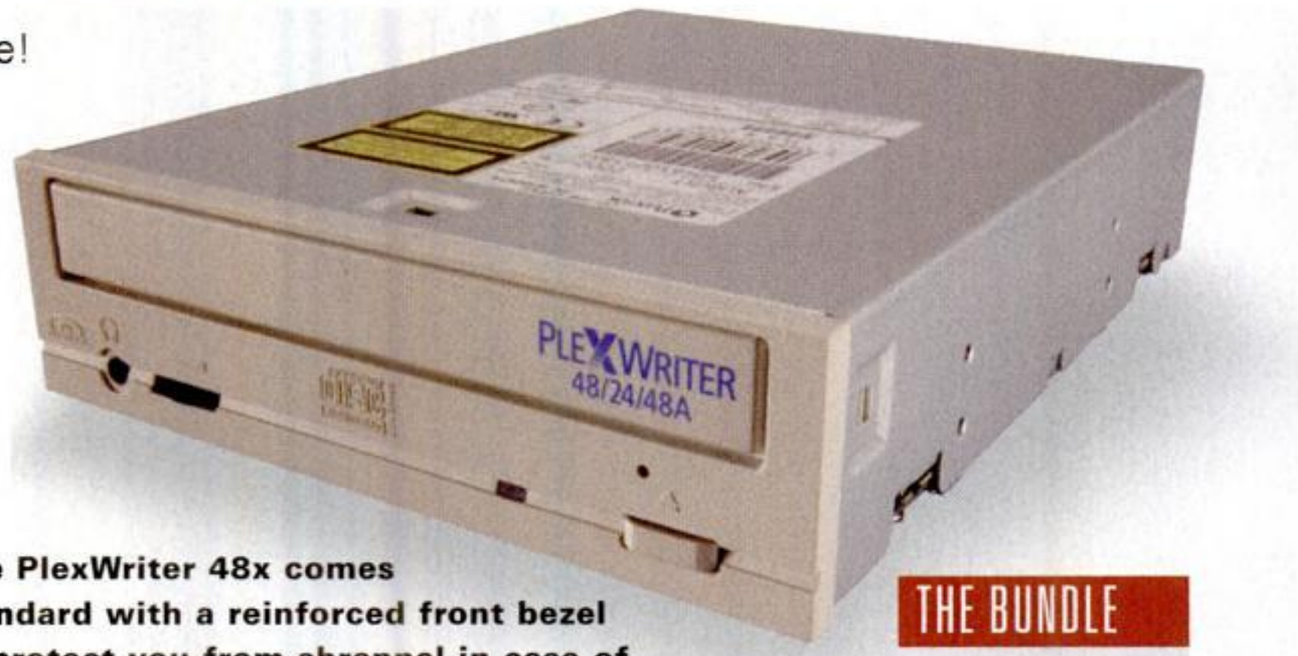
PlexWriter 48/24/48 CD Burner

Faster speeds and better burns in the ultimate triple-X drive!



The PlexWriter 48x comes standard with a reinforced front bezel to protect you from shrapnel in case of a disc mishap.

THE BUNDLE

Roxio *Easy CD Creator Basic*, Oak Technology *SimpliCD*

Plextor is back in the game—in a big way—with its latest CD burner, the 48/24/48. This is the drive we've been waiting for, the one that strikes a *perfect* balance between Plextor's engineering conservatism (and staunch insistence on burn quality) and the power-user's rapacious appetite for speed.

The biggest breakthrough in the drive is support for 24x CD-RW. Holy moly, we recorded a CD-RW with 647MB of data in 3:47 (min:sec). Contrast this with yesterday's dreary 12x recording time of 7:14. And it just gets better. The Roxio *Easy CD Creator* "burn penalty" that's hurt performance in past drive reviews has been completely eliminated: Burning 647MB to a CD-R came in at a record-breaking 2:43, and Plextor cut the seek time for the 48x to an astonishing 62ms—less than half the seek time of the PlexWriter 40x!

The PlexWriter 40x, if you'll remember, capped digital audio burning at 24x. Plextor's own independent testing yielded too many errors in audio CDs burned at higher speeds, so the company implemented a governor. But Plextor has now raised the write-speed ceiling in this drive to 40x, allowing users to choose speeds based on their own media and experience.

The read time for optical discs has been bumped up to 48x, but this might lead to a potentially devastating problem: High-speed drives can spin discs at up to 10,000rpm, and at these speeds, flaws in the surface of the media (and even microscopic cracks in the media) are exponentially magnified. As a results, discs can, and have been known to, shatter inside the drive.

You might think a shattering disc sounds something like a wine glass breaking, but oh no, it's an explosive cacophony that sounds like the *end of the world*. And the flying shards of disc that result can blow the front bezel right off the drive, probably taking out Fluffy if she happened to be in the vicinity. For this reason, the PlexWriter 48x defaults to reading discs at 40x. So, in order to read discs at 48x, you have to press and hold the eject button for three seconds (when the drive is empty) as a way of acknowledging that you are willing to roll the dice. The front LED will then blink three times and the tray will open. Thrillseekers who choose to read at 48x, however, may take some comfort in knowing that Plextor reinforced the front bezel to protect you and your pets from possible disc mayhem.

The only downside to the PlexWriter (and it's pretty minor to us) is the redundant mish-mash of software, including the Basic version of *Easy CD Creator*, Oak Technology's *SimpliCD*, and the pointless *Liquid Player*.

The PlexWriter 48x is a premium-priced drive, but it's not a premium we feel bad about paying. Backed by the reputation and build quality of what may be the finest optical drive manufacturer on the planet, the PlexWriter is worth every penny.

—LOGAN DECKER

MAXIMUMPC VERDICT

PlexWriter 48/24/48
PLEXTOR

PLEXED

Over the years, the Plextor name has become synonymous with quality for good reason, and the PlexWriter 48x is one of the best.

VEXED

There's still no comprehensive, all-in-one software suite.

www.plextor.com
$160

10

BENCHMARKS

Average data transfer (MB/sec)	5.2
Average drive rating	35.58x
Random/full-stroke seek (ms)	62/110
Audio extraction (secs)	2:28
Data CD burn (min:secs)	3:16
CPU utilization	6%

The audio extraction test uses a commercially stamped 70:07 minute audio CD. The data-CD burn test uses the bundled applications to create a 647MB CD-R. All tests were performed using Verbatim media, except where indicated.

Update your burn-ware!

Probably no component in your PC will benefit as much (and as often) from firmware updates as your optical drive—especially updates from Plextor. As new media is released, Plextor's engineers check the discs for their reflectivity, the particular dye they use, and other properties specific to that brand, then fine-tune the drive's performance accordingly. This information is then loaded into the drive's firmware via updates available on Plextor's web site. This won't necessarily translate into faster speed, but it will reduce burn errors and ensure you're getting the maximum speed and reliability from your media. Firmware updates are free, so come on, people, do yourself a favor!

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Logitech Z-680

The best damn PC speakers we've ever heard

The Logitech Z-680s blast 450 watts of power, and will accept whatever input you have to offer.

On the surface, the Z-680 is a standard 5.1 speaker rig. But once you begin appreciating its majesty, its sheer bombasity, it becomes nothing less than a Klipsch killer. That's right: Everything that made the 4.1 Logitech Z-560 set so awesome is now available in a 5.1 system—the Klipsch Promedia 5.1 has been effectively dethroned!

The Z-680 has five satellites, a front-firing eight-inch long throw subwoofer, and a control pod. The control pod is armed to the teeth with three mini-headphone inputs for the standard analog PC 5.1 setup, a coax digital input, and a Toslink optical digital input. All the inputs in the world don't matter a whit if your speakers don't sound great, but the Z-680 didn't let us down. This 450-watt bad boy can create a deafening wall of sound while still faithfully reproducing the softest tinkling chimes playing in the background.

MAXIMUM PC KICK ASS PRODUCT

We ran our usual gamut of speaker tests and found no flaws with the Z-680's playback, even in our demanding 20Hz-to-22KHz frequency sweep. We were almost floored by the volume and intensity of the bass that these speakers produce. The attorneys in the offices next to ours were banging on the wall after just two of our eight audio tests—that's a new record! The only phrase we can think of that even begins to describe the power of this sub is "innard jiggling."

Logitech took much of what it learned from the Z-560 4.1 set and applied it to the new Z-680. The satellite design is virtually identical, sporting solo 3-inch drivers with aluminum phase plugs. The 5.1 set also addresses the complaints we had with the 4.1 set by providing a much more sturdy control pod (one that doesn't tip over), and including an input for our MP3 players. Unfortunately, Logitech is still shipping confusing speaker wire ("Which wire is positive? Which is negative? We'll never know!").

If you want the very best speaker rig we've heard for your PC, your console, and your DVD player, the Logitech Z-680 can't be beat.

—WILL SMITH

MAXIMUMPC

Z-680 Speakers
LOGITECH

+ THE ROLLING STONES

Innard-jiggling bass, fantastic mid- and high reproduction, and a bevy of input options make these our new favorite speakers.

– ENYA

Logitech is still shipping with wire that makes it almost impossible to distinguish the + from the – wire.

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10

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MacPower DigitalDoc 5

You might be better off controlling your fans yourself

We like the LCD display, but we wish it was part of an entirely different product.

The DigitalDoc 5 is a fan bus that sits in a 5.25-inch drive bay and controls your case fans by monitoring case temperatures. It supports eight fans and features a backlit digital display to exhibit all your temperature readings. At first glance, this kit looked like the answer to our prayers, but after extended Lab testing, we realized that it had more than a few undesirable qualities.

For starters, the DD5 only has three-pin fan connectors, as opposed to three- *and* four-pin connectors. This is fine if you're using 40mm and 60mm fans, but once you move to 80mm and up, your fan selection begins to dwindle. And any hobbyist who's into *real* cooling will want the larger fans. Which brings us to the next problem: Larger fans require more power. The unit has a maximum output of 1000 milliamps. A couple of high-rotation 60mm AFB series Delta fans can use 360 milliamps each, so if you go that route, you'll have already used 72 percent of the unit's maximum power output—on just *two* fans. That's totally bunk.

In order for the DD5 to control fans automatically, the fans must be matched with corresponding temperature gauges. Fine. But when you've got eight temperature sensors monitoring eight different fans, and all of the sensor wires are one color, it can get a little confusing. Would it have killed them to color-code the damn wires?

Just when we thought the annoyances of the DD5 were finally reaching their crescendo, we discovered that the unit emits a high-pitched beep whenever one of the temperature sensors kicks in and turns on one of the fans. Not only did this get on our nerves with a quickness, we couldn't figure out how to deactivate the beeps.

The hits keep on coming: The DD5 offers no variable fan-speed control, and while the LCD display is sweet, the physical interface just plain sucks. The unit more or less works as advertised, but it's fraught with so many little problems, it all adds up to a flawed product.

⊕ **COMEDY CENTRAL:** Looks good and comes with a backlit LCD.

⊖ **LIFETIME CHANNEL:** Low power output, no four-pin connectors, no variable speed control.

—JOHNATHAN MCKINNEY

MAXIMUM PC VERDICT: 6

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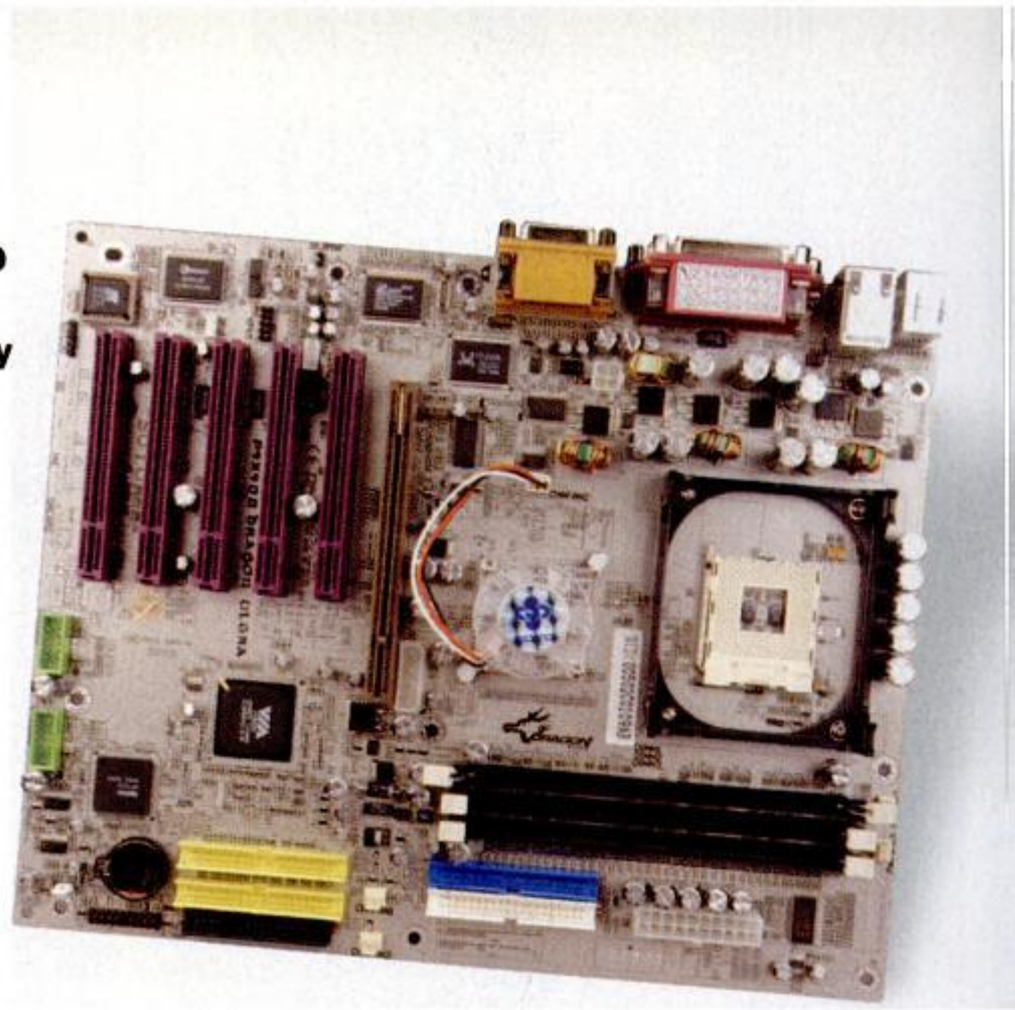
P4 Mobos, DDR Style

Plus an early preview of dual-channel DDR266

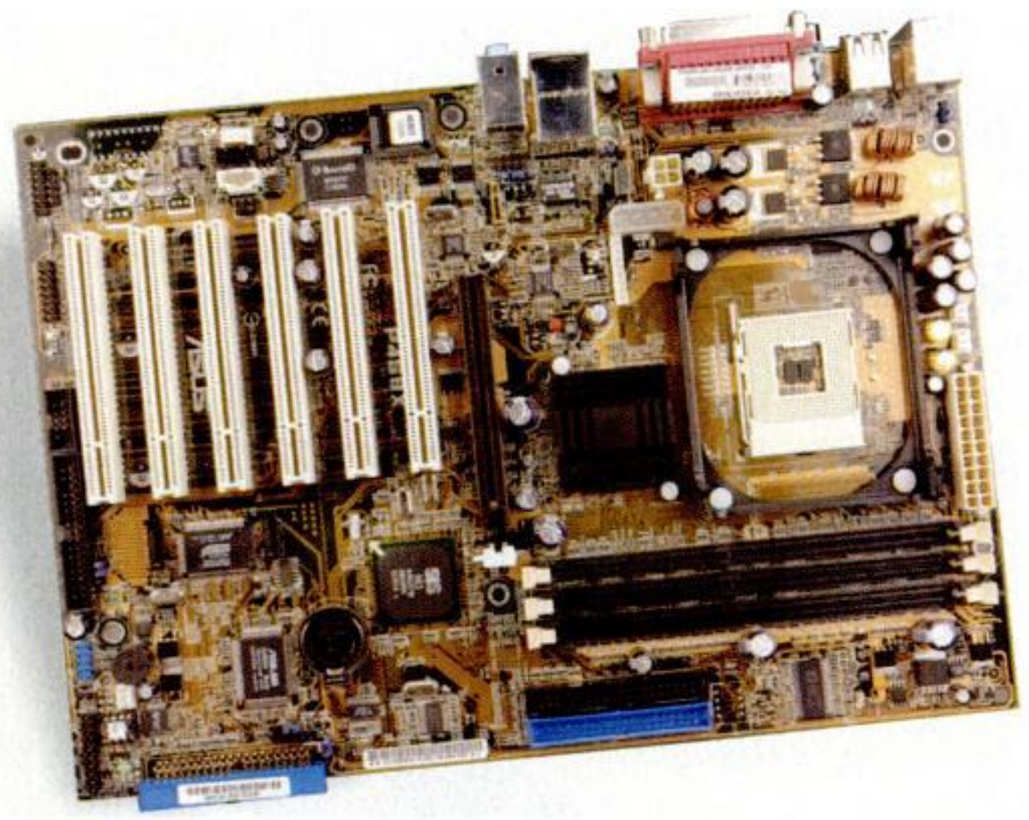


Soyo's P4X400 Dragon Ultra didn't offer any compelling arguments in support of DDR400.

Considering a DDR-based mobo for your new Pentium 4? Let's start with the positives: DDR memory is cheaper than RDRAM, and Pentium 4 rigs running DDR tend to trail their RDRAM counterparts by just 5 to 10 percent during benchmarking—a statistically insignificant difference, some would say. And let's not forget that the DDR mobos tend to be packed with useful features. This is a nice benefit for P4 diehards who want the luxury of the latest standards and integrated components.

Yep, we expected to be impressed by the DDR boards reviewed here, but were in fact disappointed when we found stability and performance to be underwhelming. In fact, we advise all DDR-curious power users to wait for dual-channel DDR mobos, which should be shipping in a month. See the Iwill preview in this roundup for definitive evidence.

—GORDON MAH UNG



Asus' P4S8X was fast, but had issues with DDR400 and running full loads of RAM.

ASUS P4S8X

Compared to the average RDRAM motherboard, the P4S8X is swimming in features. The board boasts the SIS648 chipset, six PCI slots, AGP 8x, onboard Ethernet, USB 2.0, and FireWire controllers. Add in DDR333 support and two Serial ATA ports (care of a Promise/Marvell controller chip), and you've got it all. A 1GB/sec interconnect between the north and south only sweetens the deal.

We used an nVidia NV28 graphics card to test AGP 8x performance. NV28 signifies the AGP 8x iterations of the GeForce4 line; our card was the Ti 4200 version. We were able to enable the 8x mode, and it generally ran smoothly but required two reboots. Oddly, some people are reporting similar problems with the Radeon 9700 and VIA's KT400 chipset (both 8x-enabled as well). Does AGP 8x offer any performance dividends? No. At least, not with today's games.

Booting problems aside, we were more troubled by the board's memory stability. Using DDR400 from both Corsair and Mushkin, we were unable to successfully POST the board at 400MHz. While neither the board nor its SiS chipset officially supports DDR400, both the Asus and SiS web sites strongly suggest that 400MHz will work. Perhaps even worse, the board couldn't simultaneously run two identical 512MB Corsair modules at DDR333 speeds. We could run three 256MB sticks, but not the 512MBs, and we saw memory performance drop by a significant amount when all memory slots were full with 256MB parts. The Asus manual suggests that you should buy RAM from only a short list of approved vendors. Not the ideal solution for most users.

It's a shame that the board suffers so many quirks, because it was stable when stuffed to the gills with other components. It also has the latest features, and performance is excellent when running just one memory module.

MAXIMUM PC VERDICT: 5

$140, www.asus.com

SOYO P4X400 DRAGON ULTRA

Although it's fighting Intel over the right to even make P4 chipsets, VIA has introduced its P4X400 chipset anyway. VIA's previous P4 attempts haven't inspired confidence. The P4X333 board we received for review three months ago wouldn't POST when more than one memory slot was used. Fortunately, the production P4X400 Dragon Ultra from Soyo had no such problems. In fact, unlike the Asus P4S8X, we were able to run the board with two 512MB DDR400 modules and a single 256MB DDR400 module, albeit with a performance loss. That's right: Even in best-case scenarios, running DDR400 on a 533MHz bus doesn't make a huge difference, and depending on how you configure your DRAM timing, DDR400 might actually yield performance losses (compared to DDR333 with aggressive timings).

The Dragon Ultra includes optical audio support (via a breakout card), as well as Soyo's Signa box, which gives you a Compact Flash/Smart Media reader and front-mounted USB 2.0 ports. The board also packs support for ATA133, and a HighPoint RAID controller onboard. Serial ATA support is offered via a PCI add-in card.

Running its bundled BIOS, the Soyo board's DDR400 performance was far behind the DDR400 performance of the Asus mobo. But a last-minute BIOS update did improve Soyo's DDR400 performance—to about the levels obtained with DDR333. Hmmm. But at least the Soyo board didn't choke when we filled nearly every PCI and RAM slot, and added a USB mouse and USB-powered hard drive to the mix. All told, we'd still pass on the P4X400 Dragon Ultra, but we're interested in seeing Soyo's inevitable dual-channel DDR offering.

MAXIMUM PC VERDICT: 7

$150, www.soyousa.com

INTEL D845PEBT2

Intel with an attitude? You heard us right. The most conservative of all mobo companies is making a pitch for gamers and enthusiasts with its Blue Mountain 2 board. Featuring a

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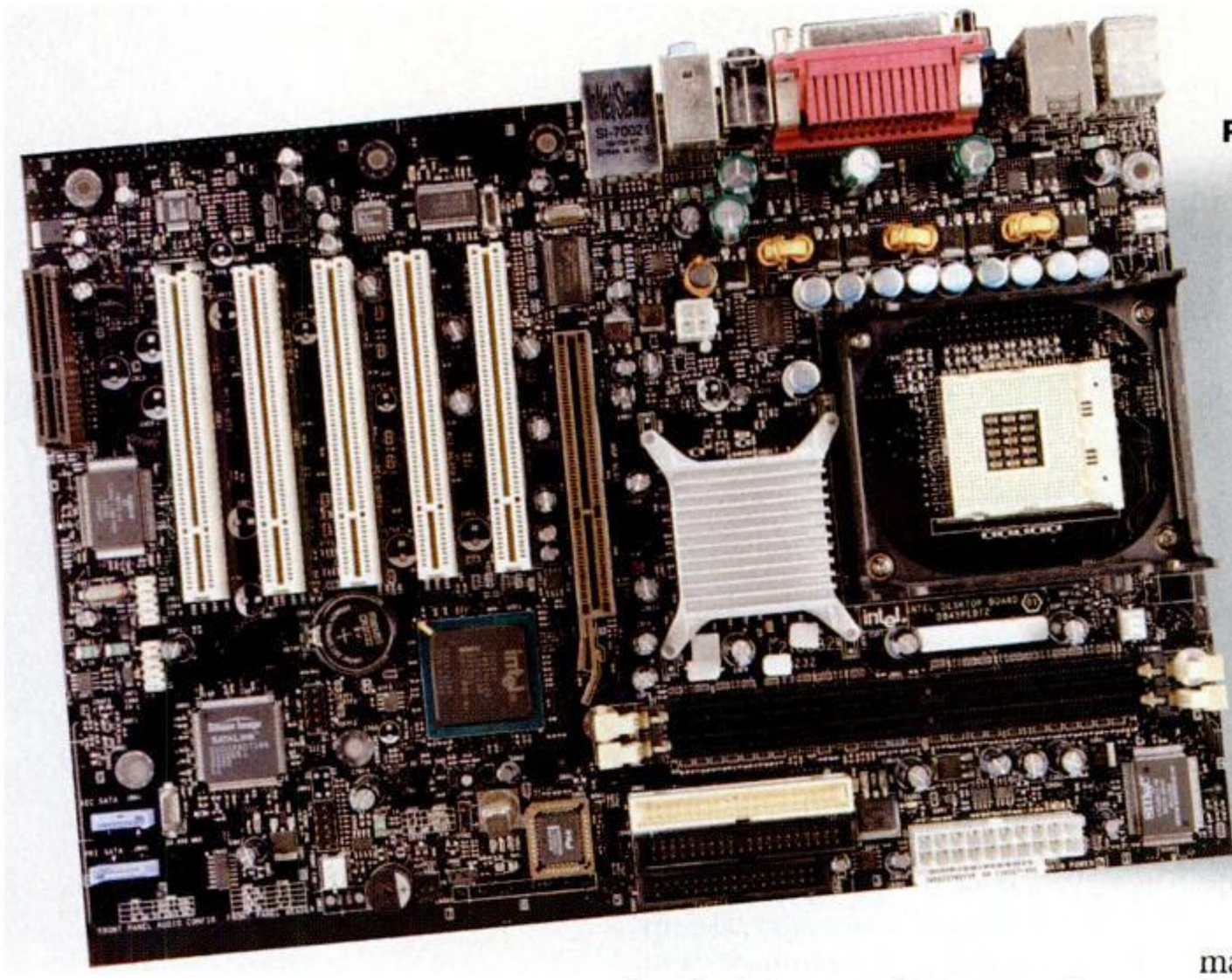


Perhaps the least-conservative Intel board we've tested, the D845PEBT2 gives you speed and reliability.

black PCB, serial ATA RAID support, and onboard FireWire, LAN, and USB 2.0 (in the ICH4 southbridge), the Blue Mountain 2 is about as wild and crazy as Intel gets. The board also includes DDR333 support and tweakable memory settings, but the big news is the new 845PE chipset, which is the only production chipset featured here to support HyperThreading.

With a 533MHz FSB P4, you can run DDR333 at very aggressive timings (P4s intended for the 400MHz bus are confined to DDR266). In this roundup, the Intel chipset ran neck-and-neck with the VIA and SiS chipsets in *SYSmark2002* and *SiSoft Sandra*, and just plain kicked everyone's butt in *3DMark 2001*. We can only attribute the performance to the AGP implementation in the Intel chipset. It's confined to AGP 4x, but that doesn't hurt its performance. The same can be said for DDR400. The Intel board wouldn't do DDR400, but does it even matter? The Asus and Soyo boards have overclocking features galore, but the Blue Mountain 2 gives you the peace of mind that comes with the Intel brand.

MAXIMUM PC VERDICT: 8

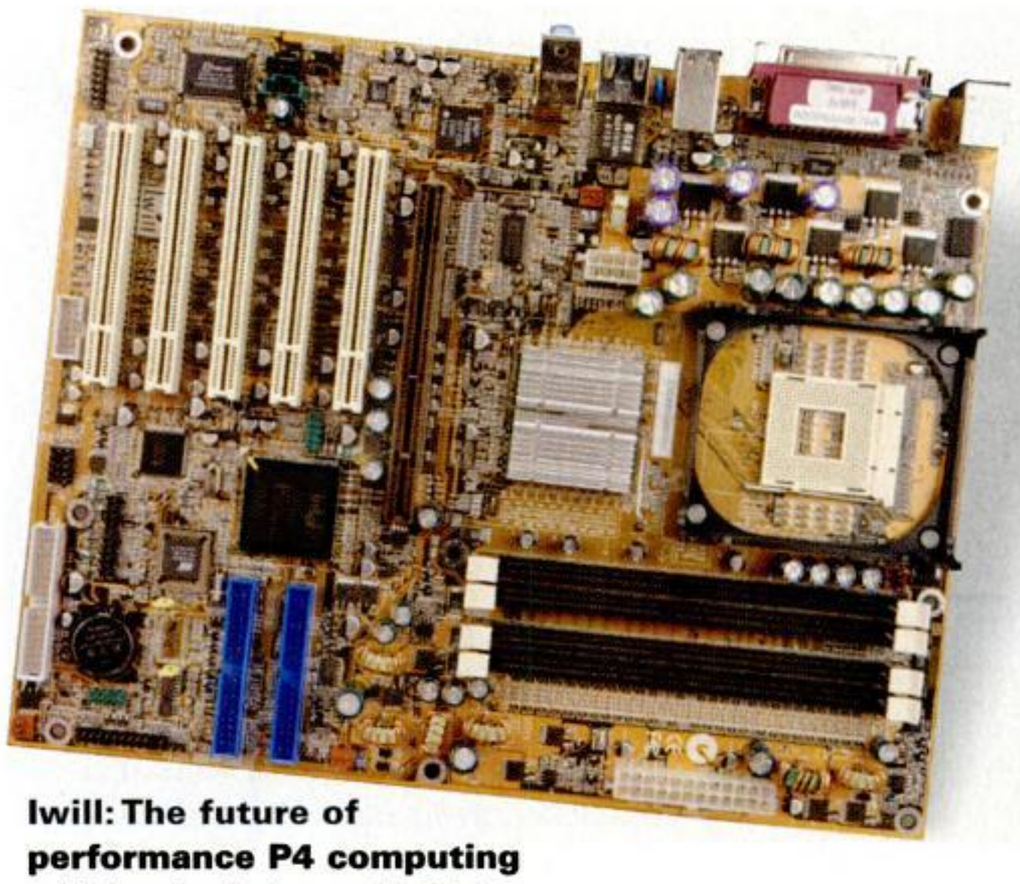
$140, www.intel.com

PREVIEW: IWILL P4GB

The future may not be about RDRAM vs. DDR—it'll likely be about dual-channel vs. single-channel DDR. We nabbed a beta Iwill motherboard featuring Intel's 7205 chipset (aka "Granite Bay") to see how dual-channel DDR stacks up against single-channel DDR333 and DDR400. Developed for the workstation market, Granite Bay delivers AGP 8x, USB 2.0, and support for dual-channel DDR266 (with dual DDR333 possibly in the works). Because it was originally intended for server boxes, the Iwill requires a power supply that conforms to the heftier EPS 12V Server System Infrastructure spec. At least the heftier price is offset by the P4GB's pro-level chipset and onboard Gigabit Ethernet support.

The rev of silicon we previewed wasn't final, nor were its drivers ready for prime time, but we still liked what we saw: Performance blew away the single-channel DDR boards, and even surpassed PC1066 RDRAM in some benchmarks! Considering the price of PC1066 RDRAM, the P4GB and Intel 7205 boards would make promising alternatives to RDRAM—if not for their expensive power supply requirements. But the Iwill P4GB is really just a precursor, because VIA, SiS, and Intel have plans for D-DDR chipsets for desktops in the coming months.

Estimated cost, low $200s, www.iwillusa.com



Iwill: The future of performance P4 computing will be dual-channel DDR.

DARE TO COMPARE: P4 DDR MOBOS (PLUS ONE RDRAM MOBO FOR COMPARISON'S SAKE)

	Asus P4S8X w/333	Soyo P4X400 w/333	Soyo P4X400 w/400	Intel D845PEBT2 w/333	Iwill P4GB w/266	Intel D850EMV2 w/1066
SYSmark2002 Overall	256	245	244	249	259	260
SYSmark2002 Internet Content Creation	342	336	338	334	351	350
SYSmark2002 Office Productivity	191	178	176	185	187	193
3DMark 2001 SE overall	12,461	12,536	12,472	13,019	13,202	13,263
Quake III	324 fps	311 fps	308 fps	325 fps	346 fps	343.5 fps
Sisoft Sandra INT	2,498MB/s	2,424MB/s	2,565MB/s	2,505MB/s	3,312MB/s	3,280MB/s
Sisoft Sandra Floating Point	2,511MB/s	2,422MB/s	2,564MB/s	2,501MB/s	3,310MB/s	3,274MB/s

Best scores are red. Tests conducted with a 2.53GHz P4, 512MB of Corsair DDR400 and Mushkin DDR400, WD1200JB, and GeForce4 Ti 4600. The NV28 4200 board was only used for AGP 8x compatibility testing; it scores are not reported here. Compatibility testing consisted of a 3Com 3C905B 10/100NIC, Pinnacle System DV500 DVD PCI capture card, Adaptec 39160 Ultra 320 SCSI controller, Creative Labs Audigy, and Pocketec USB 2.0 USB-powered hard drive.

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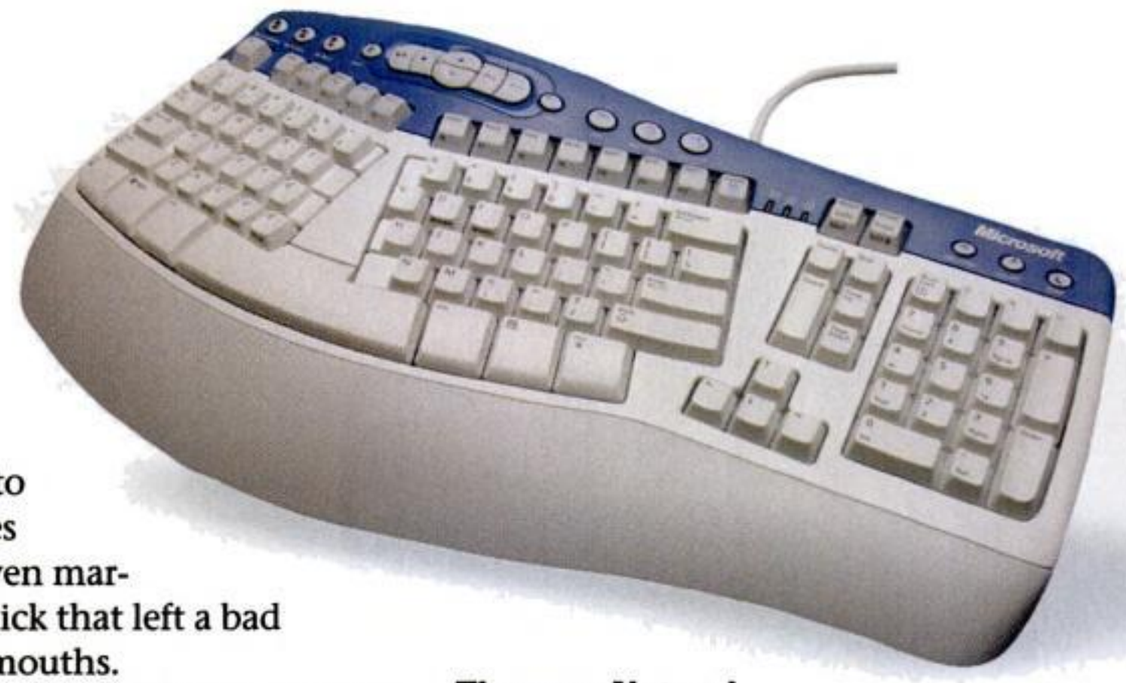
The Keyboard Conundrum

The latest finger rattlers from Microsoft and Logitech offer a lot of style, but not much substance



The new Natural Multimedia keyboard's friendly blue color didn't distract us from its lack of USB ports and its nonstandard layout.

At *Maximum PC*, we're huge fans of the classic Microsoft Natural Keyboard Pro. With 104 buttons in the standard ergonomic layout, a pair of USB ports, and 19 handy programmable buttons for web browsing and media control, the Natural Keyboard Pro is the epitome of luxury. Unfortunately, none of this year's offerings even comes close to the perfection of the Pro.

Of course, everyone's keyboard needs are different. Some people prefer traditional keyboard layouts to ergo setups, and some prefer a plain keyboard, unsullied by extraneous controls. But there are still a few things that almost everyone agrees on. Each of the 104 keys should be placed in the standard positions, and there's nothing more frustrating for a touch typist than a new keyboard that has an inordinately small Backspace key. Additionally, any of the extra buttons used to control music or web browsing should function as advertised, and also be user-configurable. Finally, we expect to see both USB and PS/2 options for every keyboard that comes our way.

—WILL SMITH

LOGITECH ELITE KEYBOARD

Logitech provides all the basics of a good multimedia keyboard—the standard key layout, plus volume, media control, and web control keys. The Elite also includes extended functions for the F keys (this year's hottest new keyboard trend). But we didn't like the fact that the web control buttons, which can be programmed to launch any URL you please, are permanently labeled for activities such as shopping and iTouch. Even worse, several of the URL buttons are preprogrammed to launch into Logitech sales areas—a craven marketing gimmick that left a bad taste in our mouths.

Even though the big volume knob on the Logitech Elite keyboard looks cool, don't be fooled. It doesn't work right.

We were also disappointed with the volume knob, which suffered slow, laggy performance. Trust us, it was bad. When we'd turn the volume knob just a tiny bit, it would take up to 20 seconds for the volume to actually change. Simply unacceptable.

On the other hand, Logitech's new iNav scroll wheel is useful. It provides quick access to frequently used folders and apps, such as My Pictures and My Music, and can be configured to do tasks within apps. Clicking the wheel opens a menu, where you can select a folder or set a function. The wheel function can be set to perform one of a variety of helpful tasks, from normal vertical scrolling (just like a standard mouse wheel) to zooming in and out in *Photoshop*.

If not for the Logitecentric e-commerce buttons and flaky volume knob, this keyboard could have been a contenda.

MAXIMUMPC VERDICT

Elite keyboard
LOGITECH

+ 125 WORDS PER MINUTE

This keyboard looks good and has agreeable key-play. The iNav wheel on the left side of the board is useful.

– 12.5 WORDS PER MINUTE

Looks aren't everything. A dysfunctional volume knob and self-promoting software put this keyboard on the "avoid" list. Plus, there's no ergo version.

www.logitech.com
$50
6

MICROSOFT NATURAL MULTIMEDIA KEYBOARD

This keyboard falls short of the mark set by its predecessor, the Natural Keyboard Pro. It includes 104 keys, but not in a standard layout: Microsoft teamed up the Scroll Lock key with the Pause/Break key, and the Insert key with the Print Screen key. This is good news for people who habitually wipe out massive sections of copy after accidentally pressing the Insert key. Now, to enable the stupid Insert function, you have to press the Print Screen/Insert key with F-lock selected. Microsoft also breathed new life into the F-keys by mapping a commonly used function to each one. Actions like Undo, Send, Close, and Print are easily accessible via the new F-lock key, which toggles the F-keys between their default behavior and the new actions.

The Natural Multimedia Keyboard isn't without its flaws, however. Our number one gripe is that the navigation key area—the traditional home of Insert, Delete, Home, End, PageUp, and Page Down—is completely rearranged. Touch typists, beware! We were also bummed to find that the new Microsoft keyboard omits the two USB ports that we've grown to love on the Natural Keyboard Pro. For a $55 keyboard, we expect just a little bit more.

MAXIMUMPC VERDICT

Natural Multimedia Keyboard
MICROSOFT

+ QWERTY

An ergonomic design and useful multimedia buttons can't save this keyboard from its flaws.

– DVORAK

It's foolish to design a keyboard with a nonstandard layout. Does no one at Microsoft touch-type? And PS/2 only? And where are the USB ports?

www.microsoft.com
$55
7

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80GB Hard Drive Royale

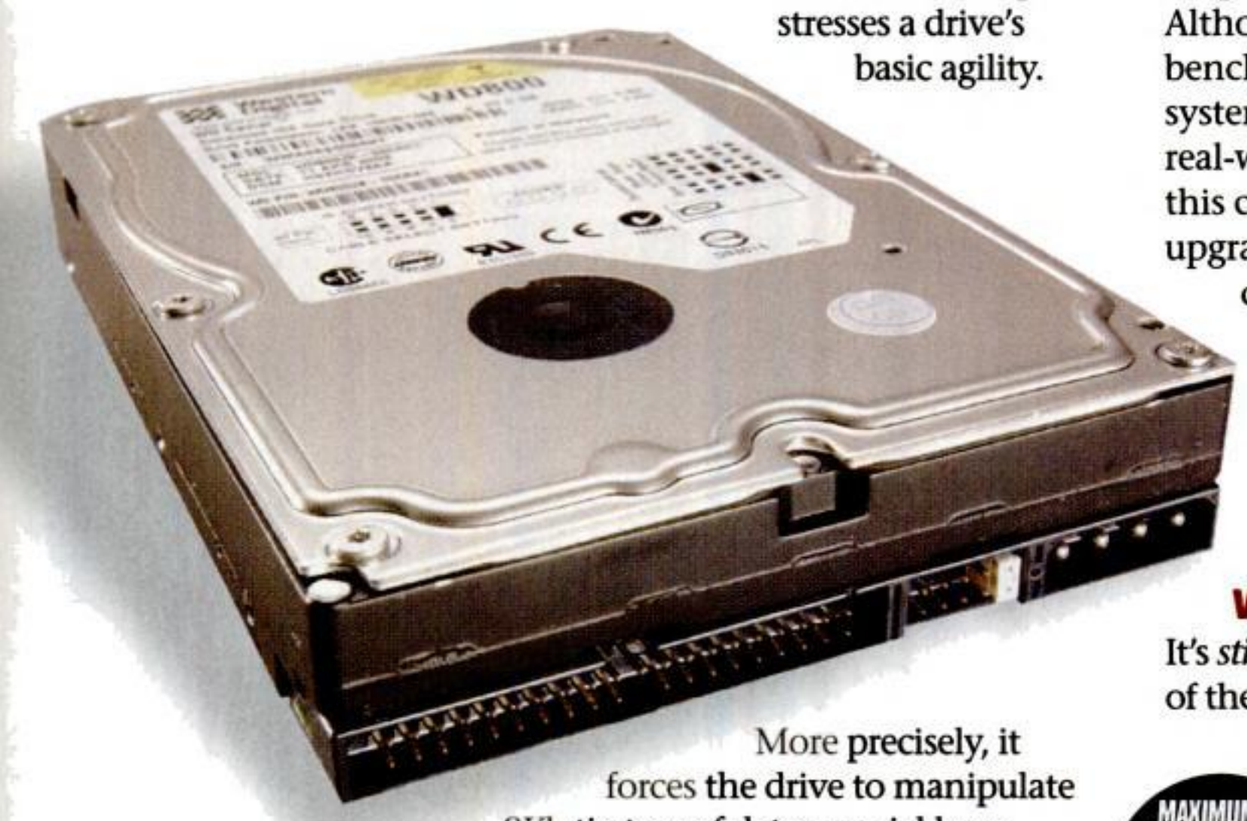
Four drives, one champion, three contenders

Quick access times give the IBM 120GXP an edge in desktop performance.

Today's fight card begins with the Seagate Barracuda V and Maxtor Diamondmax Plus 9, the latest contenders for the world title of Fastest 80GB IDE Hard Drive. But these freshmen aren't standing in the winner's circle just yet. They still have to get past the Western Digital JB and IBM 120GXP series drives, which are way beyond their primes, but not yet down for the count.

Do the aging heavyweights have what it takes to defend their titles one last time? We'll find out soon enough, but let's first meet the tests that will help us gauge desktop performance.

▸ Our *IOMeter* script stresses a drive's basic agility.



After nearly a year, we're tired of giving WD 8MB buffer drives props. Somebody make something quicker already!

More precisely, it forces the drive to manipulate 8Kb tic-tacs of data as quickly as possible—writing one 8Kb chunk for every four reads. From one task to another, there's an 80 percent chance that the next chunk of data will be randomly placed (in other words, the data won't be located where the drive head is currently situated). The script is a good barometer of how well a drive might perform when you're loading complex apps with many DLLs, or when working with multiple files simultaneously.

▸ *HDTach* takes a blank drive, and reads or writes to it, from beginning to end, all in a single action. Unlike *IOMeter*, the *HDTach* activity is sequential. That is, instead of chewing through many pieces of data scattered all over the place, the benchmark manipulates a large chunk of data that's written across continuous drive sectors. *HDTach* not only provides a graph of performance across the entire drive, but also reports peak, low, and average transfer rates for reads and writes. While gigantic, continuous reads and writes are uncommon for regular desktop use, they do occur when editing large video and audio files. More critical to overall performance is the *HDTach* random access test, which reports how long it takes for a drive to situate its head from one random location to another.

▸ *SYSmark2002* measures overall system performance in real-world apps, and its Office Productivity script is particularly drive-intensive. Although it's a rather generalized benchmark (in that it hits all PC subsystems), it does run a drive through real-world disk access patterns, and this can illustrate just how a drive upgrade might affect your overall computing experience.

Now that you've met our judges, it's time to mix it up in the ring.

—BRIAN LAM

Western Digital 800JB

It's *still* the greatest! It's the champion of the *world*! Simply stated, this is the best overall desktop drive at the 80GB mark.

MAXIMUM PC KICK ASS PRODUCT

Regular readers of *Maximum PC*, you already know plenty about the Western Digital "Jumbo Buffer" series. This 80GB version weighs a little less than its larger and better-known 120GB sibling, but is armed with the same 8MB buffer and will beat up your loading times just as quickly.

Not only did the 800JB earn second-best in the *HDTach* sequential read/write test, it also managed 136 I/Os per second in *IOMeter*. While not the best drive in either synthetic test, the 8MB cache and a lack of any significant weakness helped the Western Digital take the *SYSmark2002* decision with a score of 171. In a nutshell, the drive is a multitalented fighter, handling video, audio, and game- and application loading with aplomb. And by mixing strong transfers with a finely tuned caching algorithm, the competition *still* can't touch Western Digital's aging "jumbo buffer" formula—for now.

EYE OF THE TIGER: Best overall performance, 8MB cache.

BLACK EYES: Only second-best in two benchmarks.

MAXIMUM PC VERDICT: 9

$140, www.wdc.com

IBM 120GXP

IBM started out making computers for big business before you were born, and this drive can't hide its white-collar server heritage. Displaying an affinity for server-like performance, the GXP had some of the strongest sequential writes (23.9MB/sec in *HDTach*) and the absolute quickest random access times (12.0ms). While fast writes remain underappreciated in the read-oriented desktop environment, low random access times can help all types of users.

DARE TO COMPARE: 80GB HARD DRIVES

	Western Digital 800JB	IBM 120GXP	Seagate Barracuda V	Maxtor Diamondmax Plus 9
Cache	8MB	2MB	2MB	2MB
Interface	ATA/100	ATA/100	ATA/100	ATA/133
Platter density	40GB per platter	40GB per platter	60GB per platter	80GB per platter
Spindle speed	7,200rpm	7,200rpm	7,200rpm	7,200rpm
Warranty	1 year	3 year	1 year	1 year

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Deftly moving around its platters, the IBM nailed an untouchable 150 I/Os per second in our *IOMeter* test. In real-world terms, this means that when you start copying multiple files during a file search in progress, the IBM won't buckle.

If not for IBM's spotty reliability record and limited hours-on-per-month rating, its strong showing in *IOMeter* and three-year warranty would make it the strongest candidate for quasi-server duty in this roundup. But let's face it: If you're serious about running a server you'll go SCSI, so the GXP qualifies as just a really good desktop drive, through and through. The drive's strong showing in *SYSmark2002* only backs up this point. Strengths aside, the 120GXP came in dead last in average transfer reads, earning 37.2MB/sec in *HDTach*—something video-editing buffs should note. If the 120GXP could leave its server legacy behind and handle big file reads better, it would be an even better overall drive for power-user enthusiasts.

The Diamondmax Plus 9 is the fastest drive around—if all you ever do is copy huge files back and forth.

CHAMP: Three-year warranty. Good at file serving.

CHUMP: But it still can't beat SCSI drives. Slow at large file transfers.

MAXIMUM PC VERDICT: 8

$138, www.ibm.com

Maxtor Diamondmax Plus 9

The Maxtor Diamondmax Plus 9 is stuffed with a *single* high-density platter and reliable fluid spindle bearings. These newfangled bearings kill vibrations, allowing for more reliable, quieter, and cooler operation. As a result, this 'roid-freak of a drive can run amok over your naughty DivX and MP3 files, and it bested even the WD800JB in average transfers rates. In *HDTach's* sprint, the Maxtor read and wrote at 40.3MB/sec and 25MB/sec, respectively. The Western Digital mustered just 39.6MB/sec and 23.9MB/sec.

Unfortunately, the Maxtor ran into trouble when any sort of drive head maneuvering was required—random access time was a slow 14.1ms. *IOMeter* also tripped up this meathead, causing it to pull in the worst score of the bunch at 109 I/Os per second—nearly 30 percent fewer I/Os than the IBM drive. So forget about multitasking with this drive. *SYSmark2002* scores were also the worst of the bunch, proving again that raw sequential transfer speed doesn't necessarily translate into strong desktop performance.

To be fair, we have to mention that an 8MB buffer version of this drive is on the way, and the very idea of a large buffer coupled with an 80GB-per-platter areal density gives us high hopes for the Diamondmax Plus line. If Maxtor can manage to finesse its caching strategy and access times, the larger-buffer version of the drive has a good shot at being the fastest ATA desktop drive ever.

SLIPPING PUNCHES: Fluid bearings and amazing areal density. The best at big file transfers.

SLIPPING AND FALLING: Clumsy during multitasking. Still no big buffer?

MAXIMUM PC VERDICT: 7

$130, www.maxtor.com

Seagate Barracuda V

The latest Seagate features fluid bearings like the Maxtor drive, but left us curious as to what's actually *new* in the new Cuda drive. Sure, it has 60GB next-gen platters, but by failing to meet the new cache size standard set by the 8MB Western Digital, the Seagate's stat sheet got our pulses only partially racing. Still, regardless of its mediocre specs, the Cuda's respectable random access performance helped it score 135 I/Os per second in *IOMeter*, a smidgen below the Western Digital drive. Unlike the Westie, however, the Seagate suffered low average read transfers in *HDTach* (37.3MB/sec), and much worse writes (20.4MB/sec). In sum, you have crippling transfer rates coupled with mediocre I/O and random access—all of which led to a lagging *SYSmark2002* score of 161.

This drive isn't the Cuda we were looking forward to. We want big buffers and serial ATA, and we want it now!

Like Maxtor, Seagate has an 8MB buffer version of this drive in the works, but it will only be available with a serial ATA interface, and will start at 80GB. For now, the current variant of Seagate's next-gen technology isn't a real contender, but stay tuned for its updated versions.

MIKE TYSON'S PUNCH OUT: Fluid bearings. Better than anything made a year and a half ago.

DON KING'S BLOW OUT: But not good enough today. No big buffer.

MAXIMUM PC VERDICT: 7

$130, www.seagate.com

BENCHMARKS

	Western Digital 800JB	IBM 120GXP	Seagate Barracuda V	Maxtor Diamondmax Plus 9
SYSmark: Office segment	171	165	161	161
HDTach average read transfer	39.6 MB/sec	37.2 MB/sec	37.3 MB/sec	40.3 MB/sec
HDTach average write transfer	23.9 MB/sec	23.9 MB/sec	20.4 MB/sec	25.0 MB/sec
HDTach average random access	13.1 ms	12.0 ms	12.4 ms	14.1 ms
IOMeter total IO/sec	136	150	135	109
IOMeter average IO response	468.8 ms	426.4 ms	473.0 ms	589.4 ms

Red text denotes best score in roundup. Higher scores are better, except in our *HDTach* random access test and the *IOMeter* average IO response, wherein lower scores are better. All drives were tested in our standard zero-point test bed.

Web Material

Reason 2.0

Silence may be golden, but Reason is more pleasin'

Propellerhead Software's *Reason 2.0* provides you with an interface that perfectly mimics the most intense recording studio imaginable.

MAXIMUM PC KICK ASS PRODUCT

The software is essentially a giant studio in a box. You get a mixer, outboard effects, samplers, synthesizers, and a virtual hardware interface that lets you trigger the modules with a MIDI keyboard (not included) or any other MIDI controller.

Propellerhead stuck to the classic rack-mounted design in glorious, incredibly anal detail. When you create a bass line in Subtractor and name it "big fat bass," a little strip of tape labeled "big fat bass" appears on the side of the device—just as it would if you were working in your own $40,000 studio environment.

Send a signal through the delay, loop it back through another one, and then another.... Go nuts—you can't break anything.

Want to send the bass through a couple of delays and add a bit of distortion before it goes to the mixer? Do it the same way you would on a real rack—turn it around and wire it up. In *Reason*, you do this by pressing the Tab key: The rack flips around to display the back-panel connectors, and animated patch cables even sway back and forth for a few moments! Every time you add a module to the rack, it automatically "wires" itself in the most logical way, but you can also plug together devices in any manner you see fit. *Reason* will only prevent you from making cable connections that can't produce sound.Twiddle the knobs and play with the patch cords. At the very worst, you'll generate a Moby track by accident. Among the 19 modules that come with *Reason* you'll find:

➤ The Malström Synth, which uses Propellerhead's own "Graintable Synthesis." It's a nightmare to explain, but easy to experiment with—this synth can be used to create more organic and abstract sounds than traditional synthesizers.

➤ The NN-XT Digital Sampler. It lets you load pre-recorded bits of sound or music, layer them, chop them up, and map them across a keyboard.

➤ The Redrum Drum Computer. It can load up your own pre-recorded drum sounds, or supply you with a whole drum kit for a smorgasbord of styles from the included Factory Sound bank.

The entire executable clocks in at just over 5MB, and even a 450MHz P-III system loaded with 128MB of RAM ran the software with acceptable results (though we had to be more conservative when adding modules). If your soundcard has ASIO drivers, you'll be able to reduce latency to almost imperceptible intervals.

Be aware that *Reason* is not a standard multitrack recorder; it's a closed environment, and it processes only its own self-generated sounds. So you can't add your own vocal track or guitar lead, for example, to be treated and mixed within the app. You can export your music to MP3 or WAV format, but plans to make *Reason* tracks exportable to multitrack recorders like Steinberg's *Cubase* and Cakewalk's *Sonar*, are just that—plans.

The only thing that prevents us from giving *Reason 2.0* a Perfect 10 verdict is its lack of support for VST or DirectX plugins, which would allow you to use software synths and effects you already own. But there's plenty to do with *Reason* nonetheless. Download it. Try it. Buy it.

—LOGAN DECKER

MAXIMUM PC VERDICT

Propellerhead Software
REASON 2.0

ELECTRONICA

It really is a soup-to-nuts music composition studio. If you don't want to make your own sounds, use the included samples from the additional two-CD set.

HARMONICA

No support for third-party plugins—yet.

www.propellerheads.se*
$400

9

***That's .se, as in Sweden, where Reason and its software siblings were made.**

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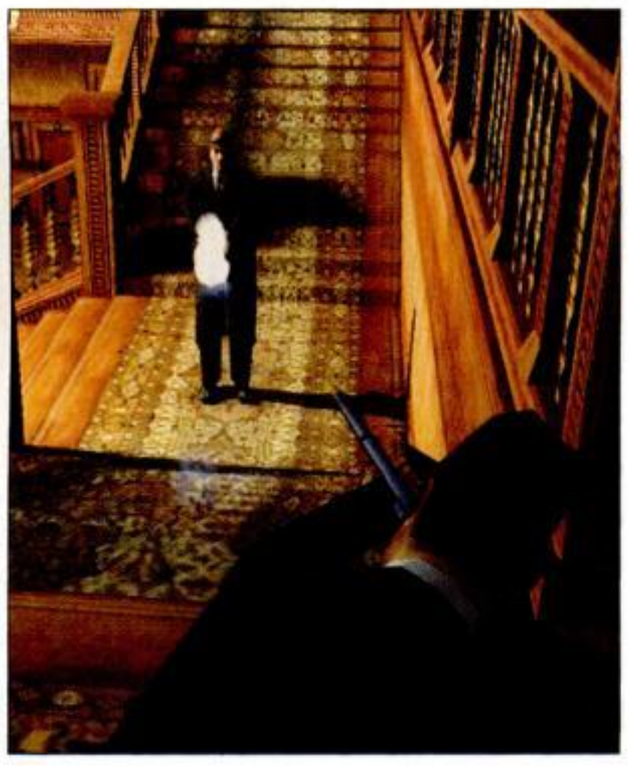
Mafia

Hits on all the positives of organized crime

Character models are superb, with plenty of small touches that make them look like more than mannequins wrapped in textures.

The miraculous thing about *Mafia* is all that it's not. It so easily could have been tacky, tasteless, offensive, corny, and clichéd. It could have suffered the wretched writing of *Max Payne* or the base depravity of *State of Emergency* or *Kingpin*. And it could have been a weak rip-off of *Grand Theft Auto 3*, whose environment engine it more or less mimics. Instead, it strikes a fairly classy tone from the start, with a stylish title sequence complemented by a remarkable musical score. It manages to keep this tone as it tells the familiar story of Tommy, a young cab driver who falls in with the mob during the 1930s.

Unfortunately, Tommy doesn't get right down to bidness. Instead, the designers show off *Mafia's* marvelous city setting with a protracted series of mandatory, timed cab-driving assignments before you finally get a chance to firebomb the cars of a rival gang—and then it's back to driving around! Just as you're beginning to wonder if you're going to spend the next 15 hours playing a mob cabbie, the game finally kicks in, and with the high quality of most everything that follows, the draggy bits are forgiven.



Someone with a strong cinematic sense worked on the visual style of this game, creating a unique look akin to the flashbacks from *Godfather II*.

You do wind up driving some more—particularly in a difficult race sequence made merely frustrating by the limited car controls—but from there on out the pace and story pick up, as Tommy gets taken into the confidence of mob leader Salieri. Though the narrative hits on the usual mob elements—collection, bodyguard duty, bombing, gun fights, theft, assassination, evasion—it manages to avoid being a tasteless wallow by focusing on a central character with a conscience. It not only makes the game more palatable, but also makes it far more interesting.

Also helping drive the narrative standpoint are the stylish cutscenes, featuring characters with highly detailed and expressive faces. Voice acting is hit or miss (and the voice recording sounds hollow and poorly mixed), but it's not cringe-inducing, which is the most one can hope for in a computer game.

If there's a real star of the game, however, it's the city, a wide open metropolis filled with a variety of people and cars roaming freely. Modeling and textures trump *Grand Theft Auto 3*, and we've never seen a game create such a fully imagined place, with pedestrians that react sensibly to cars (the police will collar you if you knock a person down) and cars that stop at lights, honk when you get in their way, and maneuver through the busy streets. The place names, such as New Ark and Hoboken, are meant to evoke New Jersey, but in fact the game is set in an imaginary place with ethnic neighborhoods, museums, factories, slums, and even a slice of countryside. In the course of the narrative game you'll see almost all of the city, while in the Free Ride mode you get to explore areas at your leisure.

The game interface and action are both fine, but they don't offer anything particularly new. You view Tommy from behind, which can be awkward at times because you can't see what weapon is in hand. He crouches, jumps, climbs, fires, and interacts with the environment. Tommy's missions are always interesting, though some gamers may soon tire of having to drive to each new location. Driving, in fact, is a huge part of the game, and while it adds to the illusion of "realism," it also gets repetitive. Furthermore, for a game that focuses so heavily on driving, we were disappointed with the in-game mini-map. Instead of a dynamic streetmap that shows the way to your next objective, à la *GTA3*, *Mafia's* map is nothing more than radar, showing the position of neighboring cars, mobsters, and cops. To figure out how to get from place to place within the city, we had to keep referring to the paper map that ships with the game, which forcibly yanked us back into reality.

Other than excessive driving, there's very little to carp about in *Mafia*. The few scripting gaffes are pretty minor. For example, we killed one thug, only to have him reappear after a cutscene. The real achievement is the way *Mafia* combines a well-told story with a sharp visual style and solid gameplay to create a vivid experience.

—THOMAS L. MCDONALD

MAXIMUM PC VERDICT

Mafia
GOD GAMES

+ AL CAPONE
A remarkably detailed, living 1930s cityscape. Good storytelling and visual style. Plenty of diverse driving, stealth, and combat missions.

– BUGSY MALONE
The driving controls are a little cludgy, and you drive a lot. The beginning drags a bit.

www.godgames.com
$50
8

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MISSIONS +490% VIOLENCE +430.5% DEATHS +150% FAME +95.2% EGO -

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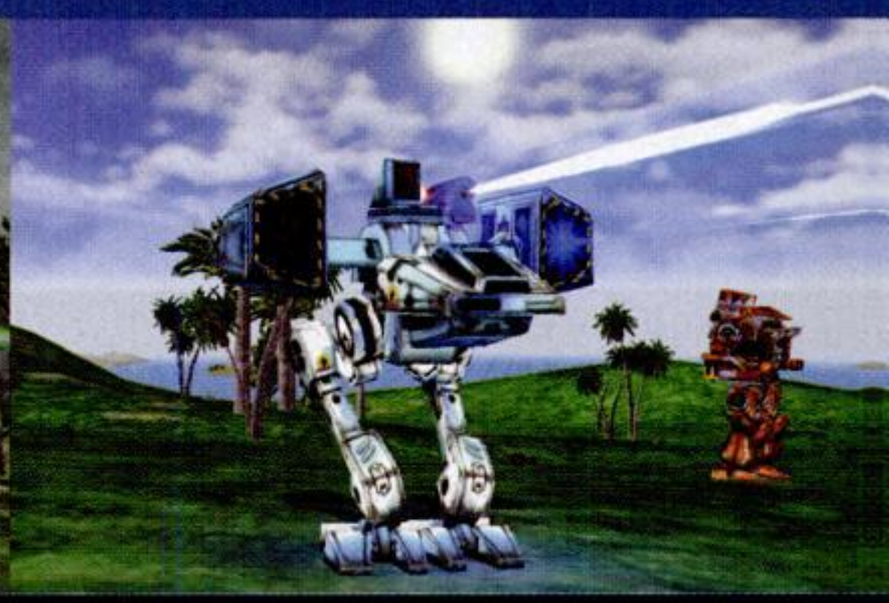

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No One Lives Forever 2

An interactive movie in the truest form

A stun grenade leaves a pair of henchmen seeing stars and ready for you to dispatch.

MAXIMUM PC KICK ASS PRODUCT

Listen carefully, because what we're about to tell you is very, very important: *NOLF2* is the best single-player first-person shooter of all time. From the level design, to the event scripting, to the weapon choices, to the character animations, to the voice acting, to the dialogue humor, to the dynamic music, it's chock-full of so many surprising and delightful nuances, you'll be left wondering how you'll ever be able to play another single-player game again, let alone watch the spy flicks that *NOLF2* mocks with such genius.

You assume the role of U.N.I.T.Y agent Cate Archer during the late 1960s. Your mission is simple: Take a massive arsenal of guns and gadgets, and save the world from H.A.R.M., an evil organization dead set on global domination. The story is superb, seamlessly spanning the continents from Japan to India to even Akron, Ohio. We especially liked the game's movie-like pacing. For example, the streets-of-India level plays out like a Keystone Cops-style chase scene—a bit of comedic relief sandwiched between two levels of heightened drama.

There might be something more satisfying than blowing away mimes, but we haven't found it.

While *NOLF2's* level design is linear, the designers managed to affect a more dynamic universe by presenting you with situations that can be solved a number of different ways, a la *Deus Ex*. When Cate encounters a bunch of baddies, she can either run in with guns blazing, killing everything in sight; distract the henchmen with a far-off sound and sneak around them; or use a gadget to incapacitate the villains, then kill or disarm them. Talk about replayability.

Monolith also added an RPG-like character-development system to the game. As you achieve main goals and bonus objectives, you receive skill points. These points can be traded for increased armor and health, better weapons skills, or even faster gadget use. Using the skill point system, you can completely tailor the heroine's abilities to match your personal style of play. Plus, the skill system gives players an incentive to seek out the thousands of hidden memos, love notes, and H.A.R.M. mission statements strewn throughout the levels.

The biggest complaint about the original *NOLF* concerned the stealth missions. There were several levels that you would fail if you were simply seen by any enemy or camera. In *NOLF2,* enemies will lose track of you if you're too far ahead, and you can also hide from them. It's easy, in fact. Find a dark corner, crouch down low, and don't make a sound until the heat's off.

The game is powered by Jupiter, Lithtech's next-gen engine. While it certainly can't compete with the *DOOM III* engine in pure pixel-pushing power, it includes realistic shadows, fantastic-looking water, and high-poly count models and scenes. The result is a game that's playable on modest machines, and super-smooth on a high-end PC at 1600x1200. Jupiter also includes support for DirectMusic's dynamic music, which *NOLF2* uses to the fullest. The surest way to know when your pursuers have given up chase is to listen to the music. As soon as the soundtrack reverts to its funky, psychedelic beats, it's safe to come out of hiding and be on your way.

NOLF2 doesn't include a multi-player deathmatch option—one is forthcoming via a future point release—but it does include something almost as compelling: a full set of cooperative multiplayer missions. Instead of simply playing the same missions from the single-player game, you're presented with "clean-up" ops that are related to Cate's original missions, but with different goals. For example, the first co-op mission takes place after the first chapter of the single-player game, when your team of two to four players must extract a "package" from an enemy stronghold. Some of the missions are a little slow, but we still expect this to be a LAN party favorite.

No One Lives Forever 2 is the perfect game. We enjoyed the story, cared about the characters, and thought about the game at the expense of all else. We absolutely love it, and know you will too.

—WILL SMITH

MAXIMUM PC VERDICT

NOLF2
MONOLITH

+ OUR MAN FLINT
Looks great, has a great story, and doesn't punish a player for adopting different play styles. Multiplayer co-op is a blast!

– IN LIKE FLINT
No multiplayer deathmatch option. The game has an end.

www.monolith.com
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Unreal Tournament 2003

Bright, fast, and colorful—just the way we like it

MAXIMUM PC KICK ASS PRODUCT

A long-standing truism says 3D game engines drive hardware development, but that's been turned on its head with the latest advancements in graphics technology, such as programmable GPUs, fat memory pipelines, and gobs of RAM. All these new hardware features are great, but where are the games that take advantage of them?

Well, the new graphics engine used in *Unreal Tournament 2003* may not be as awe-inspiring as what you'll see in *Doom III*, but *UT2003* does sport jaw-dropping visuals, blistering speed, and heaping helpings of old-school deathmatch fun ("realistic" FPS aficionados need not apply). The game's theme is quickly explained with an in-engine movie. Ripped straight from the WWE (we're talking about wrestling, folks) and set in the future, *UT2003* is deathmatch as spectator sport—*American Gladiators* with live ammo. The over-the-top characterizations, voice-overs, and texturing hit the sweet spot between "reality" and cartoon-land—much deeper than the grim future portrayed in the original *Unreal Tournament*.

Using the link gun on a teammate gives his weapon a power boost, but be careful that you don't cross the beams!

The game offers nine nicely balanced weapons, 37 detailed maps, and five modes of play, but not much innovation in basic gameplay. You'll participate in free-for-all deathmatch, team deathmatch, Double Domination (a variant of the original game's Domination), and plain-Jane Capture the Flag. The fifth mode, Bombing Run, is the most sports-oriented of the offerings, and is proving to be very popular online. You simply pick up the "ball" and throw it through the opposing team's goal ring.

Unreal-titled games have always been noted for their bot AI, and *UT2003* raises that bar ever higher—its AI is easily the best we've ever seen. Seven difficulty settings are provided, and the leap in skill from one setting to the next is notable. Each bot has a preferred weapon and four main "skills" (aggressiveness, agility, accuracy, and tactics). The bots work amazingly well in teamplay, though their offensive capabilities in CTF are somewhat lacking. They'll even talk smack, some of which can be startling. (Then again, if you're planning to play online, it's nothing you haven't heard before. Or won't hear again.)

Whether you prefer wide-open deathmatches or cramped interior battles, *UT2003* delivers.

Getting hooked up in multiplayer couldn't be easier; after launching the game, you're literally three clicks from playing. The integrated server browser is detailed, informative, and damned fast, even on a modem. *UT2003*'s net code is about as smooth as it gets, as the game is playable on everything from 56K to a T1, and handles lag spikes and packet hiccups with aplomb. With built-in Mutators to customize gameplay, a bundled-in UnrealEd tool, and promising developer support for mod authors, the multiplayer experience should only get better.

Graphically, *Unreal Tournament 2003* is gorgeous. You wanted a showcase app to impress people with your rig? You've got it, and then some. Huge, detailed textures—a gig and a half will install—bring the high-poly arenas to life. Dynamic muzzle flashes, coronas, and "projectors" (texture stencils that allow for shadowing and other lighting effects), all on top of the "usual" colored lighting, add to the reflective surfaces, pixel-shaded texturing, and texture and model transparencies. All of this makes *UT2003* almost more fun to look at than play. Surprisingly, all this beauty doesn't come at much of a cost, as the game ran glass-smooth on everything from a P-III 800MHz with 256MB RAM and a TNT2 (1024x768x16), to a 1.3GHz Athlon with 768MB RAM and a GeForce3 Ti 500 (1280x1024x32). Scalable, beautiful, and fast. And best of all, a benchmark app is installed for your bragging-rights pleasure.

Yeah, it looks great, and, yeah, it's fast and smooth, but it's a shame *UT2003* didn't come with more gaming variety out of the box. Mutators—both the ones included and the ones to come—can offset this a bit, and it should be easy to create new levels and mods. The game is definitely the pinnacle of deathmatch gameplay, but the limited gameplay modes, and the near-total lack of structured teamplay, means pickup games will be the norm. We'll still be fragging into the wee hours of the morn, don't get us wrong, but a bit more cooperative gameplay would've been nice.

—BILL MCCLENDON

MAXIMUM PC VERDICT

Unreal Tournament 2003

DEVELOPER: DIGITAL EXTREMES/EPIC GAMES
PUBLISHER: INFOGRAMS

+ RAMPAGE!

Sweet, merciful crap! It's gorgeous, scales well up and down, smooth as butter online, fast and easy to play, and the weapons are nicely balanced

– OWNED!

As far as gameplay, we've seen it all before. The announcer voice-over can be irritating

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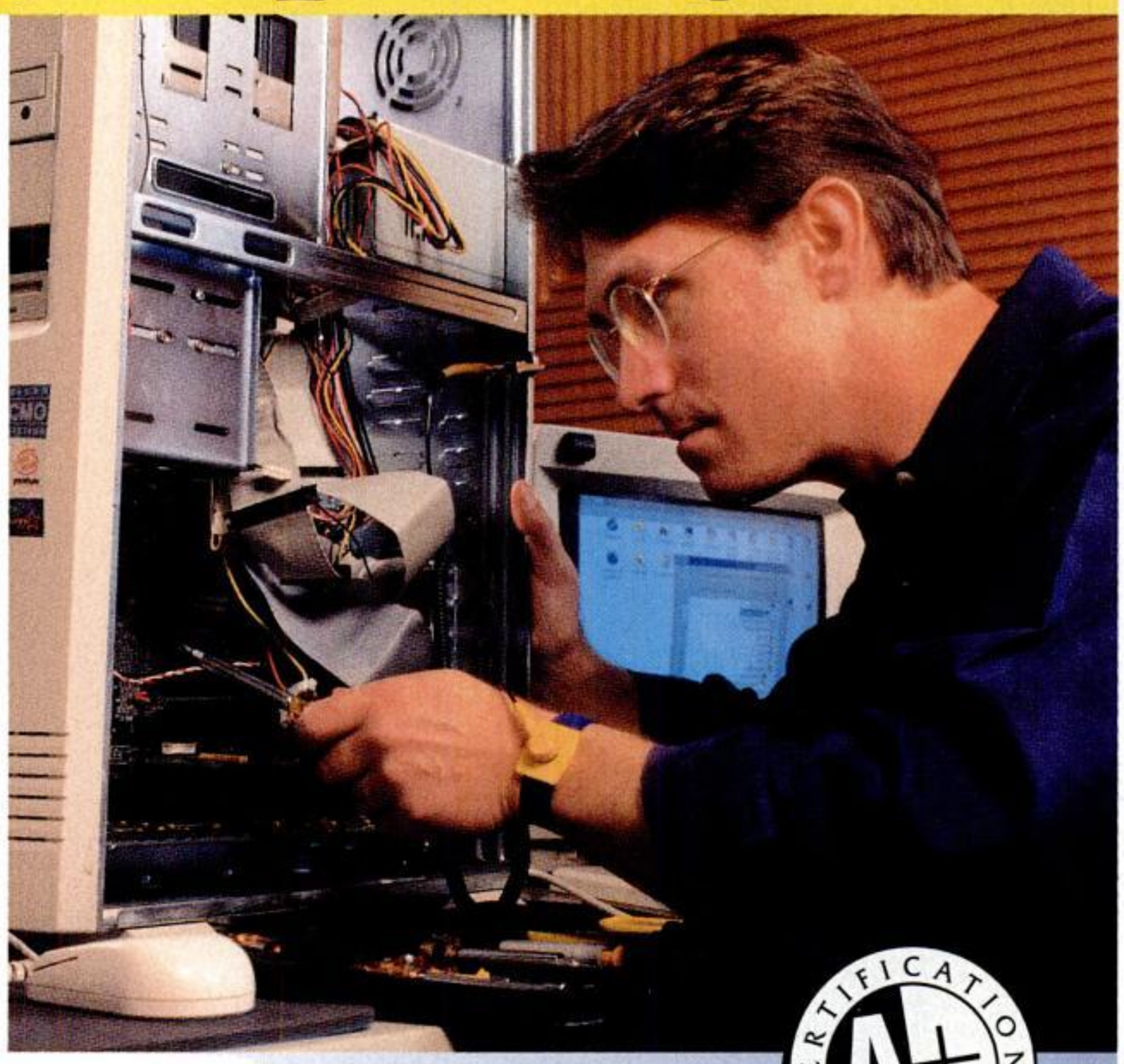

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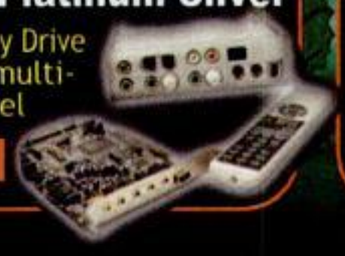

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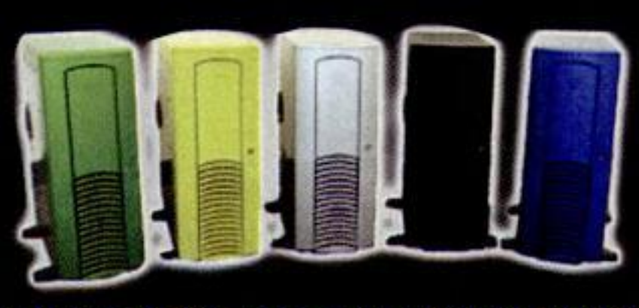

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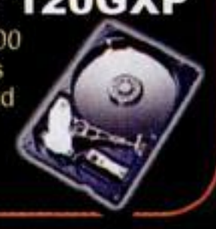

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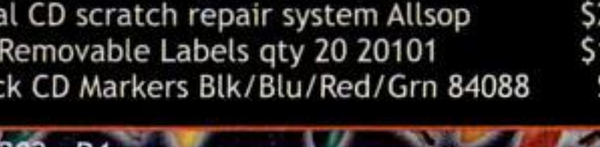

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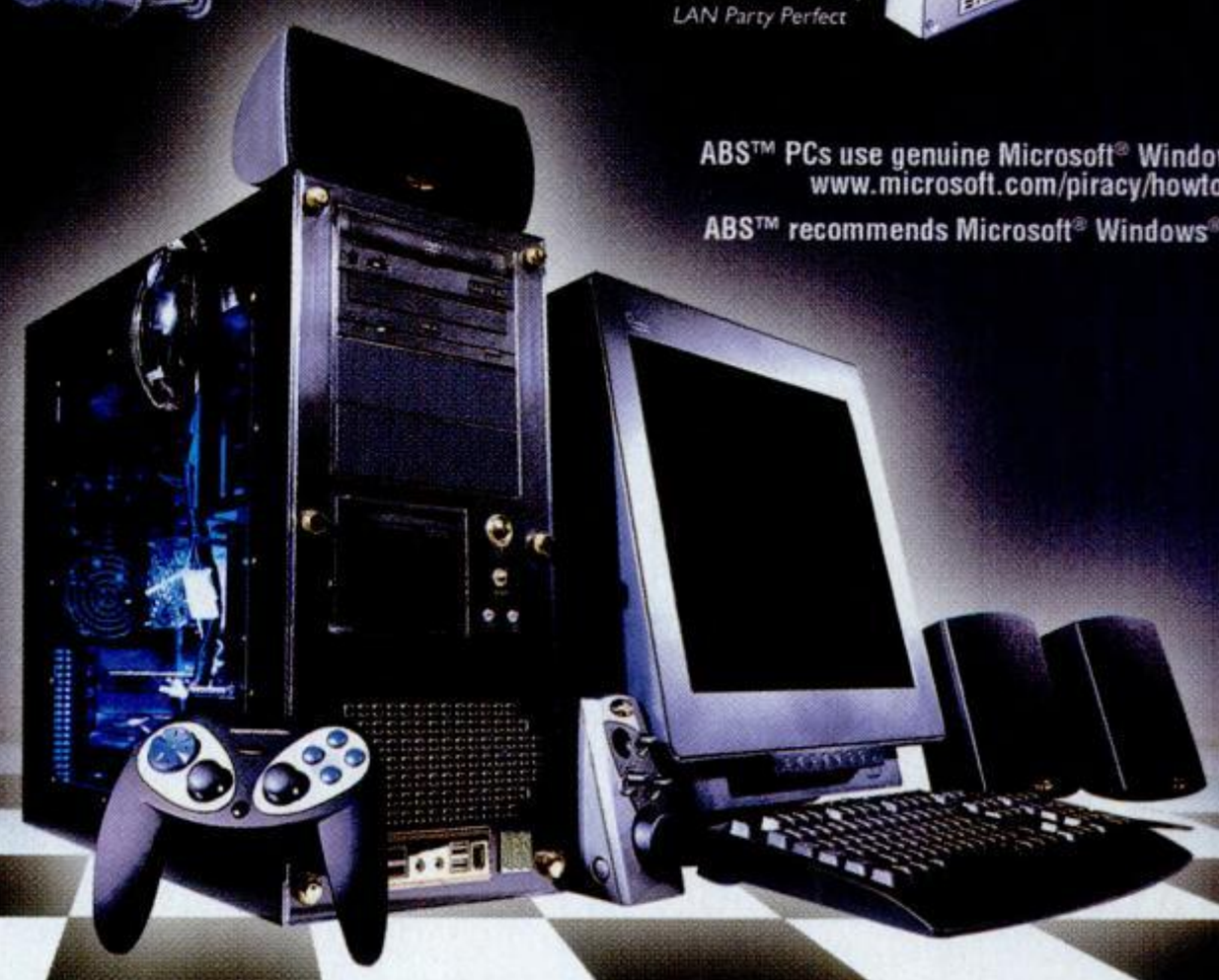

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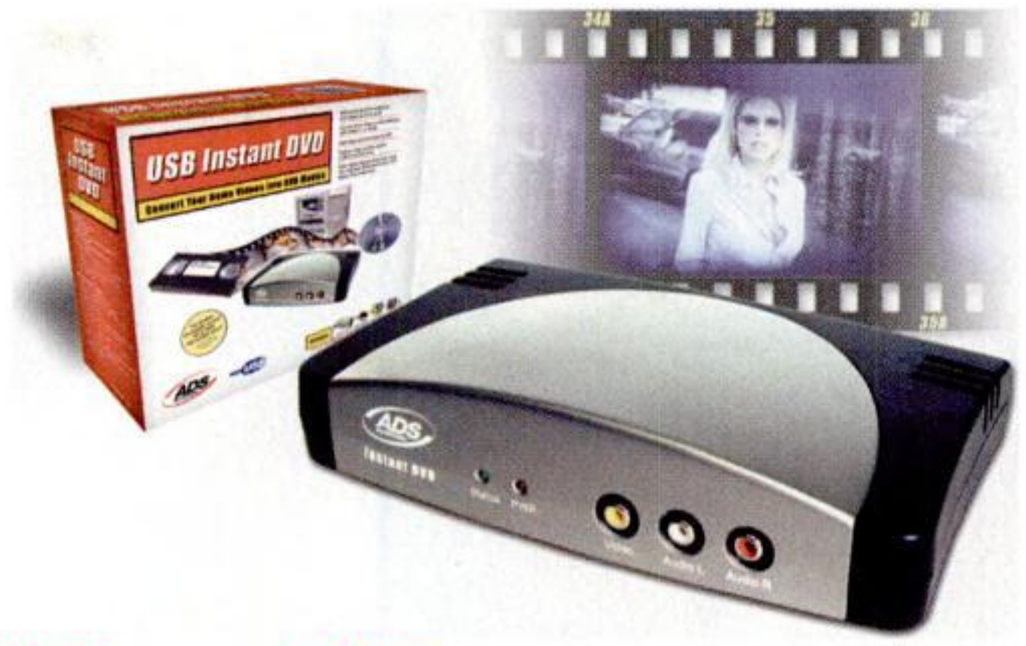

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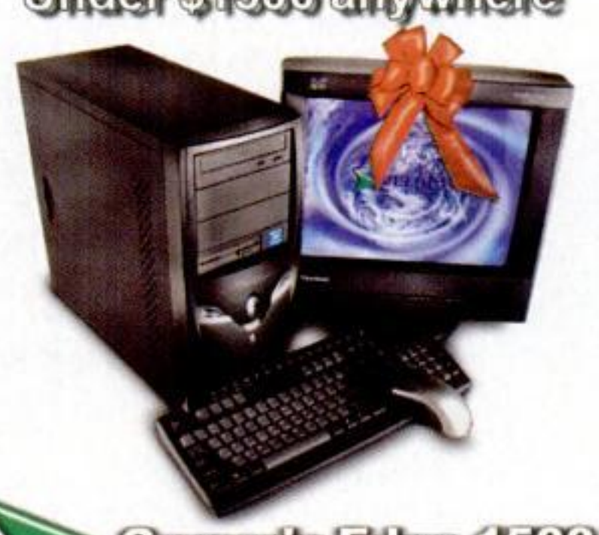

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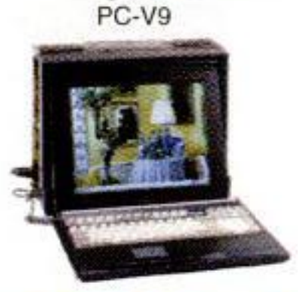

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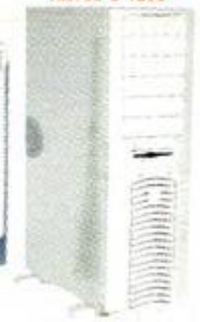

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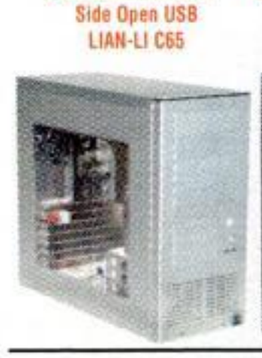

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SS SIZE (6x5 1/2x3 3/8)

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500W	N/A	210
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300W(S)	35
350W(M)	65
400W(R)	70
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460W(Z)	135
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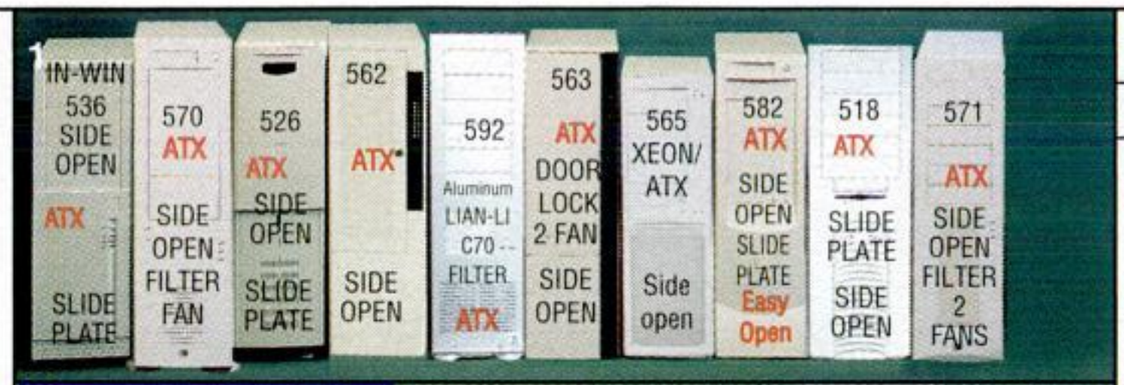

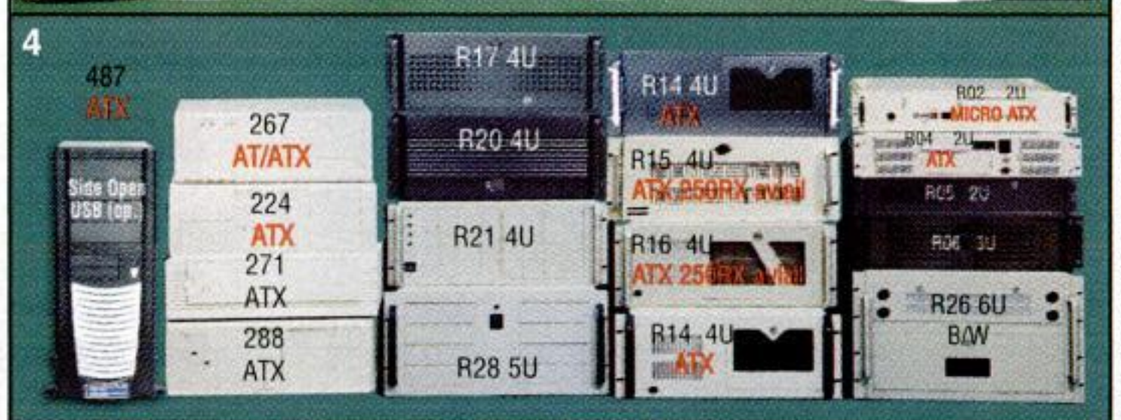

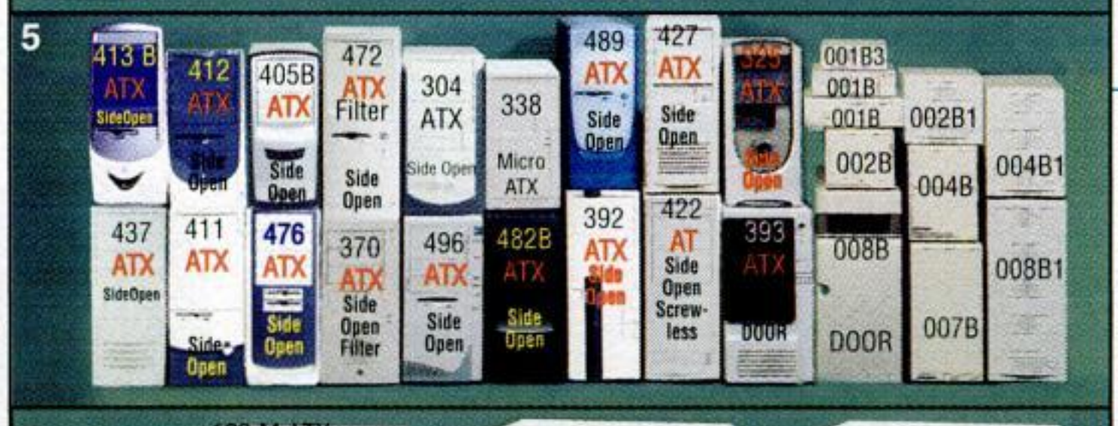

MODEL/ SPECS	Bare Bone	Dimension W.D.H	I/O ports	5.25"	3.5"	PCI	PCI ISA
105LPX socket 370	255	12x13x3.1	PS2 KB,mouse,VGA,USB,RJ45,2S,1P,AUDIO, GAME	1	1/1	3 or 0	
105LPX TV	275	12x13x3.1	PS2 KB,mouse,VGA,USB,RJ45,2S,1P,AUDIO,GAME,TV	1		3 or 0	
1070T	395	5.75x6.2x1.9	PS2 KB,mouse,VGA,USB,RJ45,2S,1P,AUDIO,GAME	1slim	0/1slim	0	0
103M.ATX 370	85	12.75x17.3x4	PS2 KB,mouse,VGA,USB,RJ45,2S,1P,AUDIO, GAME PS2	1	1/1	mini 2 or 0	
192 M.ATX 370	185	13.8x16.5x3.4	KB,mouse,VGA,USB,RJ45,2S,1P,AUDIO,GAME	1	1/1	3 or 0	
192B M.ATX 370	185	13.8x16.5x3.4	PS2 KB,mouse,VGA,USB,RJ45,2S,1P,AUDIO,GAME	1	1/1	3 & 0	

Case Specification & Price List

Model	Dimension W.D.H.	MB Size	5.25 Ext./Int.	3.5 Ext./Int.	P.S.
R02/BARE	19x17.6x3.5	M.ATX	1/0	1/1	150W
R04B/W	19x24.3x3.5	ATX	1/0	1/3	250W
R05B	19x242x3.5	ATX	1/0	1/4	430W
R06B	19x20.2x5.25	ATX	4/0	1/5	300W
R08 B/W	19x22x3.5				
R14 B/W	19x21x7	ATX	3/0	1/3	300W
R15	19x24.4x7	ATX	6/0	2/2	300W
R16 B/W	19x18x7	ATX	3/0	1/2	250W
R17 B 4U	19x21x7	ATX	3/0	1/2	250W
R20 B/W	19x20.5x7		8/0		300W
R21 B/W	19x18x7		8/0		300W
R26R/B/W	19x22.6x10.7	ATX	4/0	2/4	300W/R
R28	19x17x8.7		8/0		300W
RSP	5.8x9.3x1.6			1	
RSM169-100	5.8x9.3x1.6			1	
001B	10x11.5x3		1/0		60W
001B1	8.3x10.6x2.8		1/0		50W
002B	6.9x14.6x5.8		2/0		60W
002B1	7.5x11.2x6.5		2/0		80W
004B	6.8x15.3x9.3		4/0		230W
004B1	7.5x17.3x10.2		4/0		200W
007B	7x15.8x13		7/0		250W
008B	8.4x20.2x18.3		8/0		300W
008B1	7.5x17.9x17.1		8/0		250W
105LPX/TV	11.9x12.6x3	LPX	1/0	1/1	90W
107 bare	5.75x6.2x1.9		1slim/0	0/1slim	
111N bare	11.6x10.6x2.5	M.NLX	1/0	0/1	100W
192M.ATX/B	13.1x16.5x3.5	M.ATX	1/0	1/1	150W
224	17.4x18.8x6.1	ATX	3/0	2/2	300W
267	16.8x16.8x6.2	ATX	2/0	2/1	300W
271	17.3x15.9x5.5	ATX	2/0	1/1	250X
288	16.9x17x6	ATX	3/0	2/1	300W
304	7.9x18.8x13.9	ATX	3/0	2/1	300W
325B	8x18.5x17	ATX	3/0	2/1	250W
338	7x14.7x13.8	M. ATX	2/0	2/1	145W
366	7.2x15.5x14.3	M. ATX	2/0	1/1	250W
367	7.7x16.5x17	ATX	3/0	2/1	250W
370	8.3x17.3x16.1	ATX	3/0	2/2	250W
401	8.5x17.3x18	ATX	2/0	2/2	300W
404	8x18.8x17	ATX	4/0	2/2	320W
405B	7.8x17.5x17.2	ATX	4/0	2/2	320W
409	9.5x22x18.1	ATX	4/0	2/5	300W
411	7.2x17.2x16.8	ATX	4/0	2/1	300W
412	7.2x17.2x16.8	ATX	4/0	1/2	300W
413BL	8.5x19.5x18	ATX	4/0	2/1	300W
415	8.8x19.5x19.7	ATX	8/0	1/0	300W
418B/W	8.1x18.8x21.4	ATX	4/0	2/4	300W
422	7.7x16.6x18.1	AT	4/0	1/4	300W
424	7.5x18.9x16.7	ATX	4/0	2/1	300W
426B/W/S	7.5x17.5x19.3	ATX	3/0	2/2	300W
427	7.5x16.5x17.3	ATX	3/0	2/2	300W
430 BL/BK	8.25x19.75x18	ATX	4/0	3/6	300W
433	7.8x19.7x17.9	ATX	4/0	2/5	300W
436	8.6x18x15.6	ATX	3/0	2/2	300W
443	8x18.8x17	ATX	4/0	2/2	300W
467	7.5x16.7x18.8	ATX	3/0	1/4	300W
470	8.3x17.3x21.3	ATX	4/1	1/2	300W
471	8.4x17.5x21.3	ATX	3/1	1/4	300W
472	7.5x18x17.6	ATX	4/0	2/2	300W
474	7.8x17.2x17.2	ATX	4/0	2/2	300W
476	8x17.2x17	ATX	4/0	2/2	300W
477BL	8.75x17.5x17	ATX	4/0	2/2	300W
478	7.9x18.4x16.4	ATX	4/0	2/1	300W
480	7.8x18x16.5	ATX	4/0	2/1	300W
482B	7.8x19.8x17.5	ATX	4/0	2/2	300W
486	9.6x19.5x17	ATX	4/0	2/1	300W
487B/W	8.25x18.4x21.25	ATX	4/0	2/4	300W
489**	7.3x17x17	ATX	3/0	1/2	300W
492	8.3x19.5x17.6	ATX	4/0	3/5	300W
493B	8.3x19.5x17.6	ATX	4/0	3/5	300W
494	8.3x19.5x17.6	ATX	4/0	3/5	300W
496	8.25x17.8x16.5	ATX	4/0	1/3	300W
501	8.25x17.2x23.8	ATX	4/0	2/4	300W
503R/B	14.8x20.4x18.4	ATX	8/0	2/4	300 RW
503/B	14.8x20.4x18.4	ATX	8/0	2/4	300W
505	14.6x23x26.8	ATX	12/0	1/8	300W
505R	14.6x23x26.8	ATX	12/0	1/8	300RW
518	8.1x18.5x26.5	ATX	6/0	2/6	300W
524	13.9x25.6x19.1	ATX	7/0	1/2	300 RW
526B/W	7.5x17.5x24.5	ATX	6/0	1/4	300W
528	7.5x16.5x24.8	ATX	6/0	1/5	300W
536	7.8x17x24	ATX	5/0	1/5	300W
560/R	15x24.5x23.5	ATX	11/0	2/4	300 W/300R
562/R/B/W	8.7x17.9x26.8	ATX	9/1	1/0	300 W/300R
563/RB/W	8.7x17.9x26.8	ATX	10/0		300 W/300R
565	9.25x18.3x21.2	XEON/ATX	4/0	2/4	300W
569B/W	13.5x17.8x14	B/ATX	6/2	0/8	300W/300W
570/R	8.3x17.3x26.4	ATX	7/1	1/2	300 W/300R
571/R	8.3x17.3x26.4	ATX	6/1	1/2	300 W/300R
582	7.8x16.5x23.2	ATX	6/0	2/1	300W
588	7.8x16.5x23.3	ATX	5/0	1/3	300W
592	8.2x23.5x23.5	ATX	6/0	3/6	300W
1620/R	16.5x20.3x34.3	F/ATXx2	16/0		300 R

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**Case Color: Blue, Purple, Green, Red, Black.

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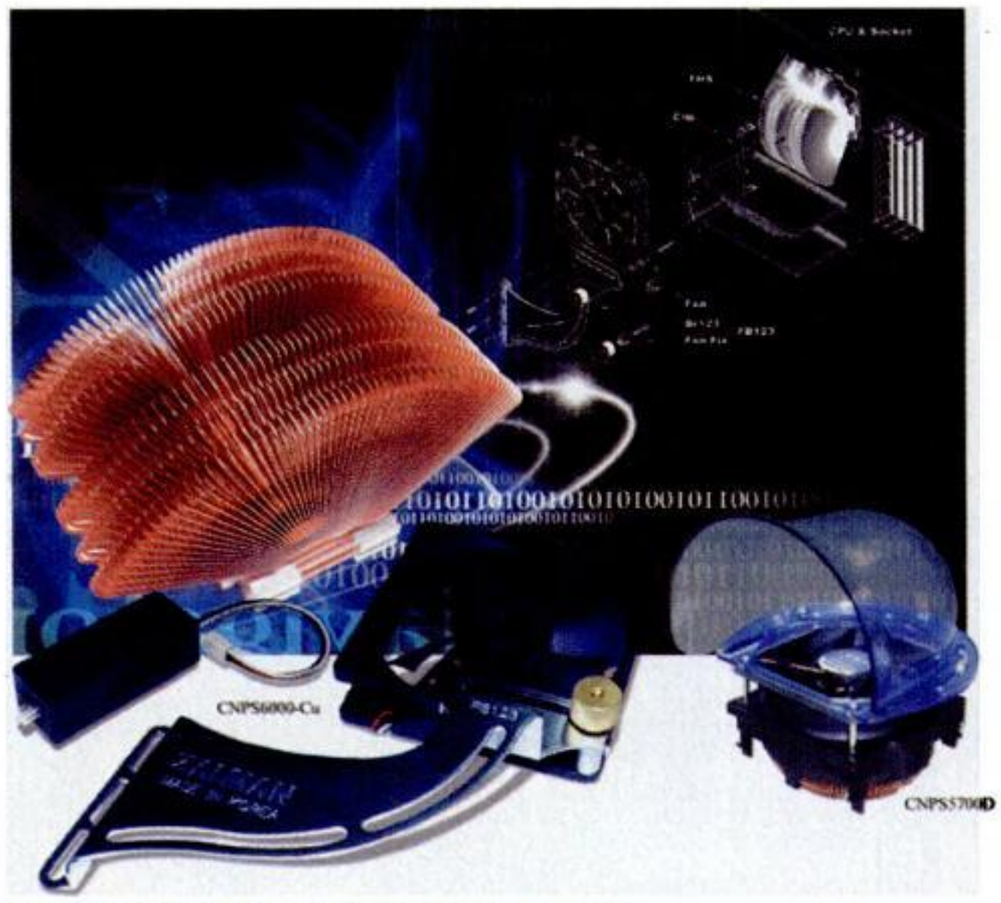

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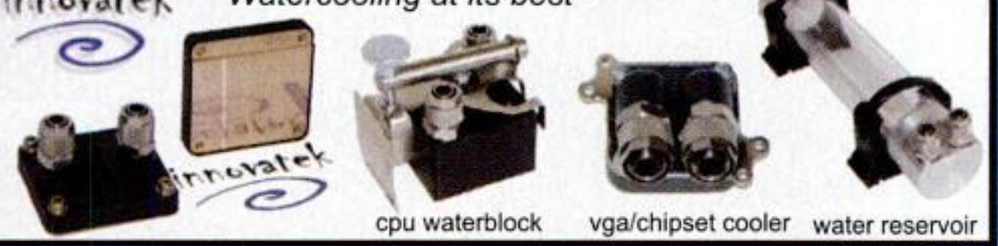

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ATI All in Wonder Radeon 8500 64 meg $238
ATI Radeon 9000 Pro 64mg Dual Heads $160
ATI Radeon 8500 128 meg DDR dual heads $190

Asus Geforce4 MX 440 64 meg, TV $125
Gainward Geforce4 TI4200 128mg $198
Gainward Geforce4 TI 4600 128mg dual hd $394
Gainward Geforce4 MX440 64 meg $125

Leadtek Geforce4 TI4200 64mg $190
Leadtek Geforce4 TI4600 128meg w/tv $394

Jaton NVidia TnT-2 M64 32meg $39
Jaton Geforce2 MX-200 32 meg $48
Jaton Geforce2 MX 400 64 meg $59
Jaton Geforce4 TI4200 64meg w/tv $160

Processors

Intel P4 - Socket 478 All Retail Box Version
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P4 2.66 GHz 512k 533 MHz bus $449
P4 2.53 GHz 512k 533 MHz bus $288
P4 2.4 GHz 512k 533 MHz bus $234
P4 2.26 GHz 512k 533 MHz bus $233
P4 2.4 GHz 512k 400 MHz bus $234
P4 2.2 GHz 512k 400 MHz bus $236
P4 2.0 GHz 512k 400 MHz bus $195
P4 1.8 GHz 512k 400 MHz bus $170
Retail Box means it comes with the Heatsink & Fan and the Intel 3 year warranty

AMD Athlon XP
XP 2200+ OEM $169, Retail Box $192
XP 2100+ OEM $143, Retail Box $159
XP 2000+ OEM $112, Retail Box $127
XP 1900+ OEM $96, Retail Box $135
XP 1800+ OEM $85, Retail Box $102
XP 1700+ OEM $76, Retail Box $90
XP 1600+ OEM $68

AMD Athlon T-Bird
1.4GHz 266 FSB OEM $95
950 MHz. 200 FSB OEM $40

AMD Duron
1.3 GHz. 200 FSB OEM $48, Retail Box $66
1.2 GHz. 200 FSB OEM $43, Retail Box $54
1.1 GHz. 200 FSB OEM $41
950 MHz 200 FSB OEM $39
OEM means cpu only, 90 day warranty
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All CPU Prices change daily, best to check website for current price

Memory

DDR SDram	PC2100 (266)	PC-2700 (333)
128 megs	$34.50	$38.40
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512 megs	**$134.40**	**$145.20**

RamBus RDRam
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256 meg 1066 MHz 32bit 232pin $116.40

SDram 168 pin Dimms by Micron

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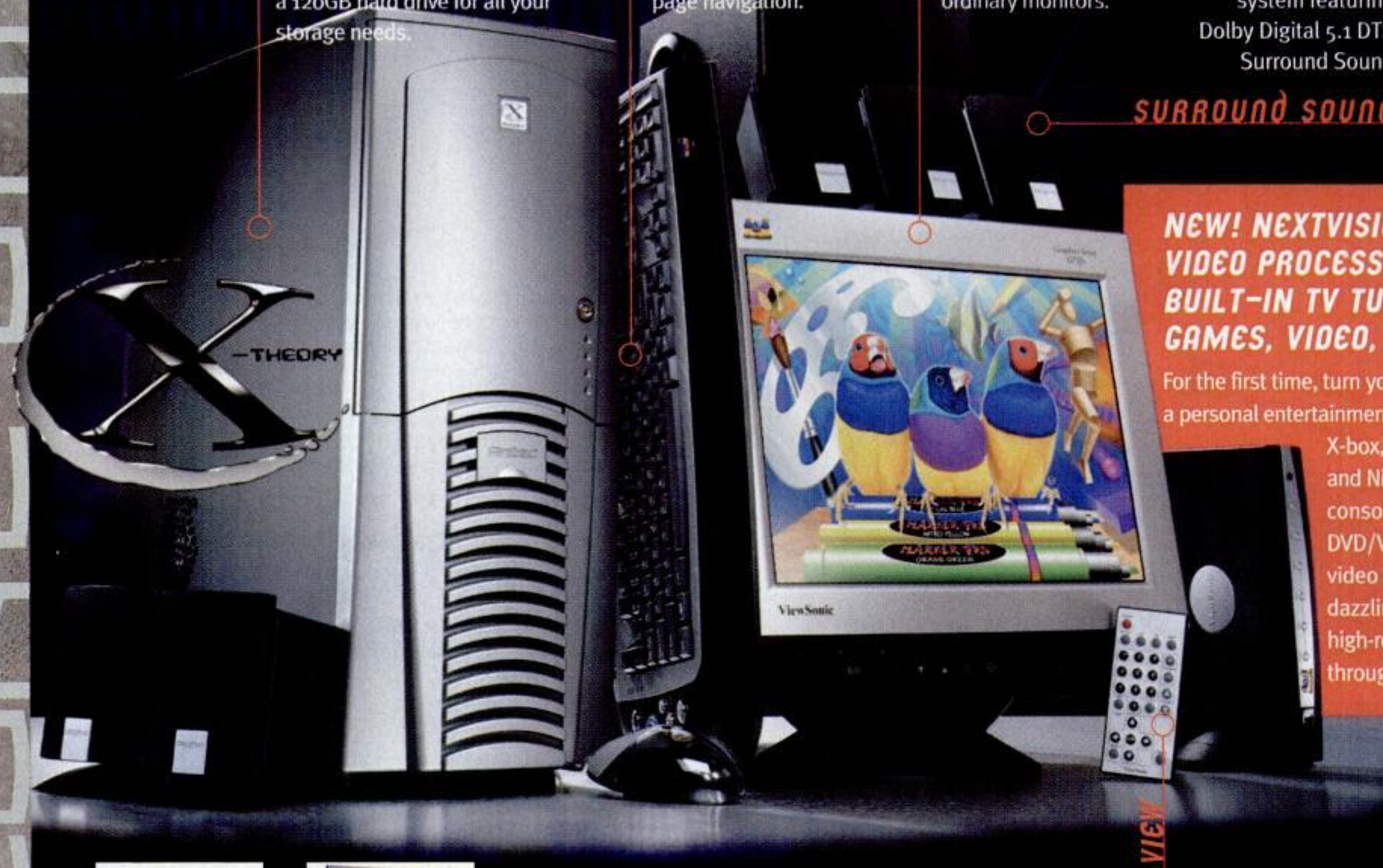

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Corsair Value Select 256MB PC3200 CAS 2.5	CMVS256MB400	$79.00
Corsair Value Select 256MB Rambus PC800	CMVS256MB800	$99.00
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MSI Geforce4 MX440 64MB	MICG4MX440-T	$74.00
MSI Geforce4 MX440 64MB VIVO	MICG4MX440-VTP	$89.00
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MSI Geforce4 MX440-VTD8X 64MB	MICG4MX440-VTD8X	$104.00
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Asus Geforce4 MX400-8X 64MB	ASV9180TD	$99.00
Asus Geforce4 TI 4200 128MB	ASV8420128A	$174.00
Asus Geforce4 TI 4200 128MB Ultra Deluxe	ASV8420UD128A	$219.00
AATI Radeon 9700 Pro 128MB Retail Box	ATIR9700128R	$359.00
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MAXIMUMPC Rig of the Month

THIS MONTH: Rob Arnold's Invisible Case

"Sometimes you have a certain mental image of what you want, and no one makes it, and nothing can be modded into it, and you just have to build your own."

That's easy for Rob Arnold to say—he's the can-do man behind this issue's ROTM. But we know for a fact that not everyone can execute such a complex design with such skill and pizzazz. Seriously, we've seen acrylic cases before, and we've even seen see-through hard drives and optical drives. But we've never seen such a complete and utter see-through conversion—it even has see-through screws! Yes, picking this month's mod was easy. Or rather, the choice was *clear*. Let's see what else Mr. Arnold has to say for himself ...

MPC: You say it was a three-month project. Does that include all the practice rigs beforehand?
RA: The three months does include all my test pieces. I did almost every cutout in the project twice, more in some cases. I was teaching myself to work with acrylic as I went. Almost all the work took place between 9 p.m. and midnight, after everyone had gone to bed, so it was far from a full-time effort.

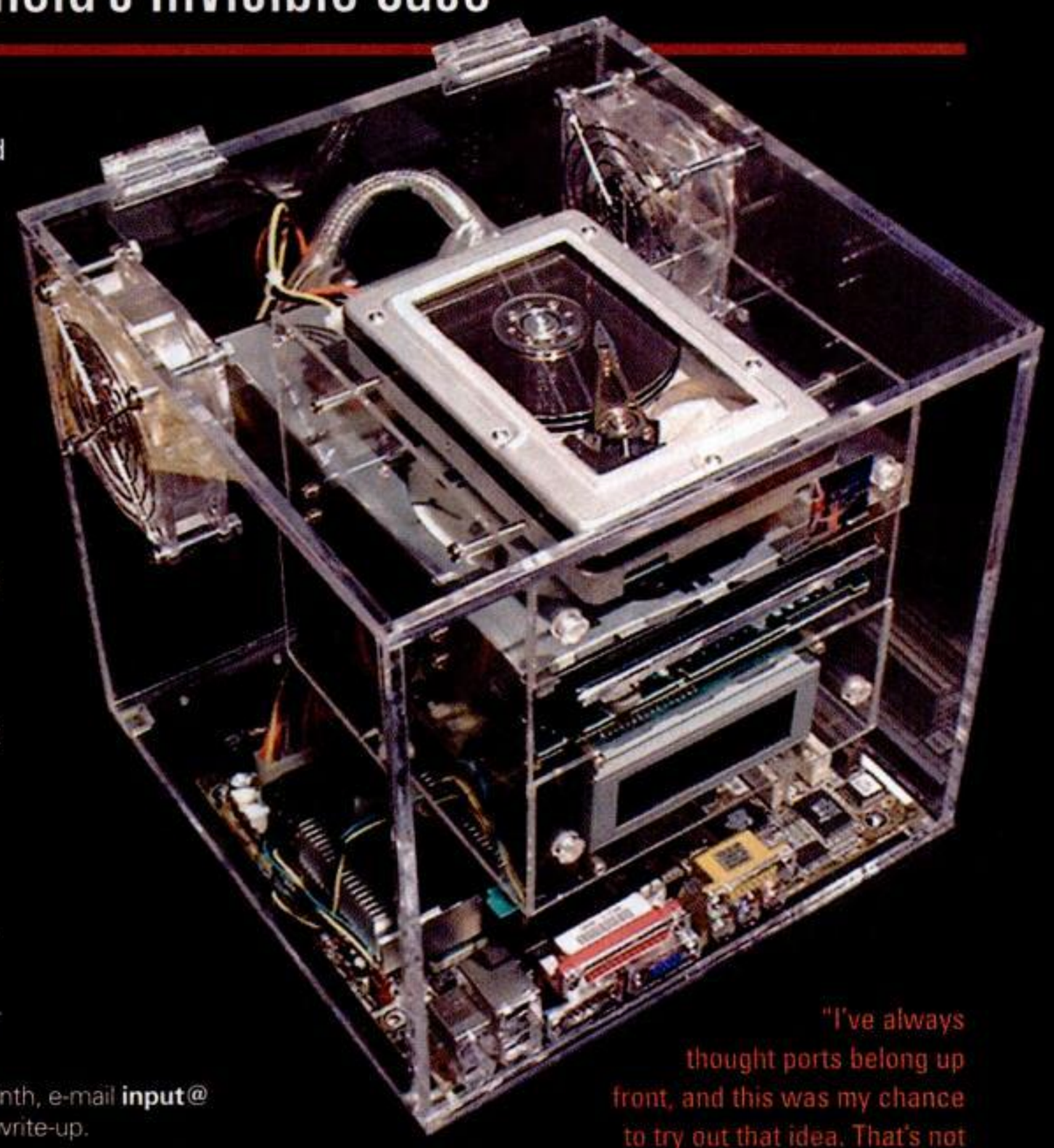
MPC: What was the hardest part of the whole project?
RA: The design and execution of the drive cage was the sticking point. I knew I wanted to have ready access to the components. Balancing looks with functionality used up most of my time during the design phase.

MPC: Did you wear a bunny suit when making the hard drive?
RA: I was a worried that if I did that, the Intel bunny people would show up and things might get ugly. So I changed into a clean T-shirt instead. As far as clean rooms go, I used a food storage bag to keep the drive safe from contamination while I worked on the housing.

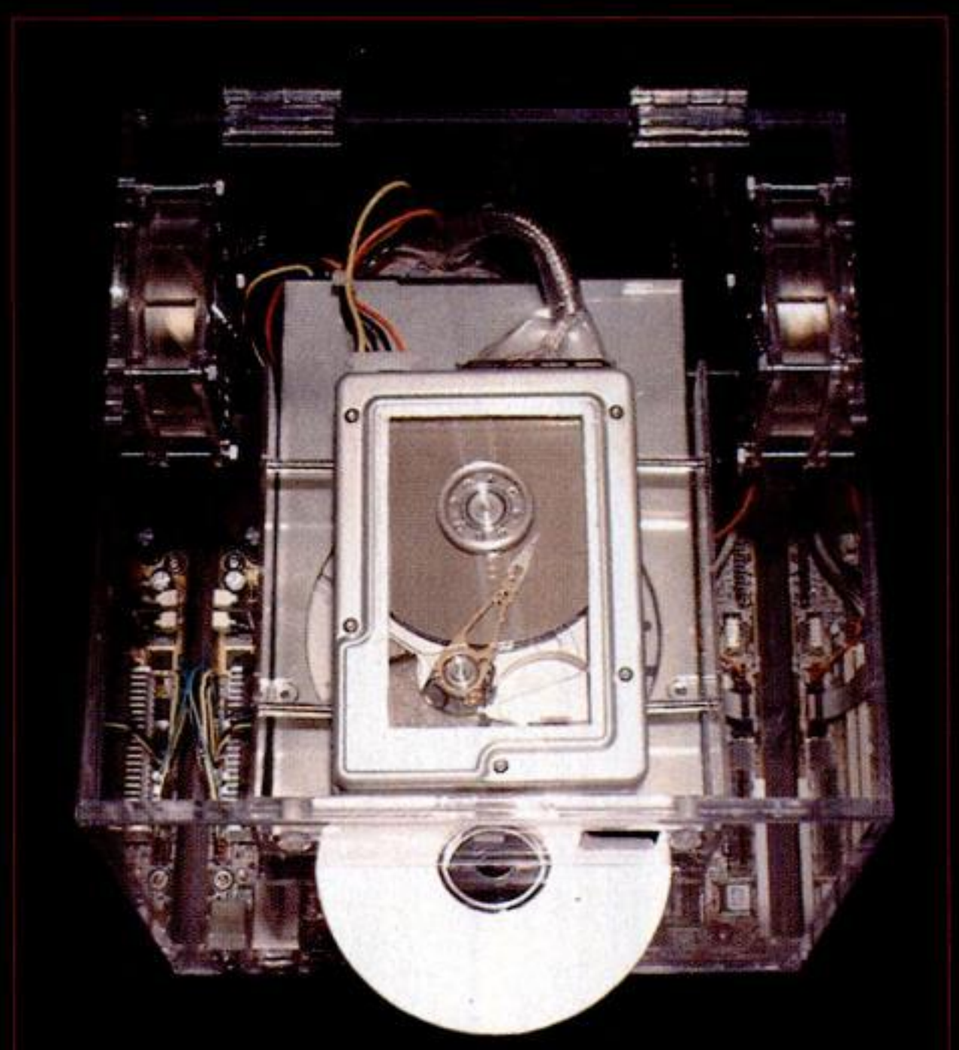
MPC: What's your next project?
RA: I'm building a case entirely out of carbon fiber composite. I'll have a full walkthrough of that project on BiT-Tech.net [by the time this magazine is on stands]. Carbon fiber composite was a real challenge to learn since there's minimal information about fabrication techniques. That's the kind of project I really enjoy—taking it beyond the current state of the art.

Full technical info can be found at **www.bit-tech.net/article/72/**.

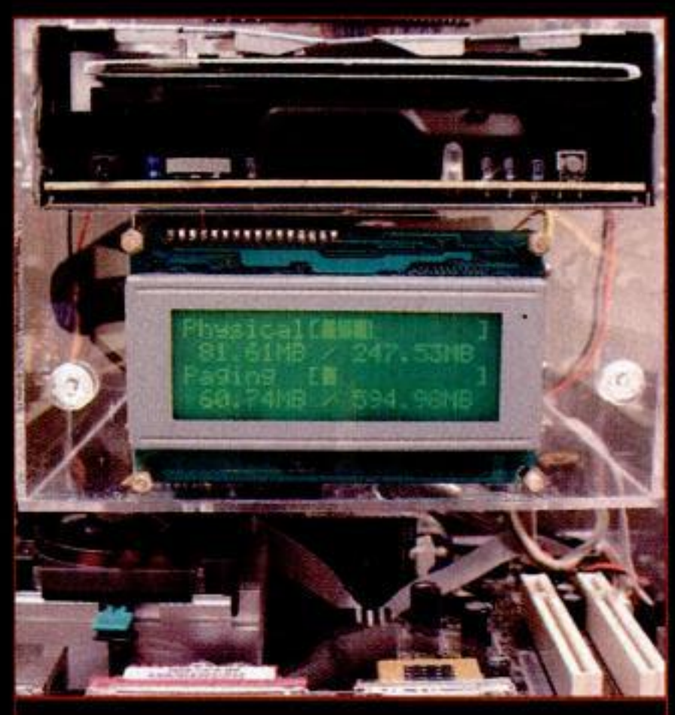
If you have a contender for Rig of the Month, e-mail **input@maximumpc.com** with pics and a brief write-up.



"I've always thought ports belong up front, and this was my chance to try out that idea. That's not something I would change. Aesthetics won out over functionality with my fan placement. I probably should have placed my intake fan lower."



As for the health of the hard drive: "It still works great, despite all the e-mail I got telling me it wouldn't even last a week. It's been a year now since I modded that drive."



"Since I run the *LCDC* software, I can make that display do almost anything. It does system stats from the OS and from *Motherboard Monitor 5*, *Winamp* visualization, text messages, e-mail notification, and it can do a lot more."

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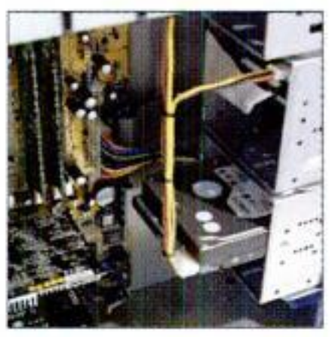

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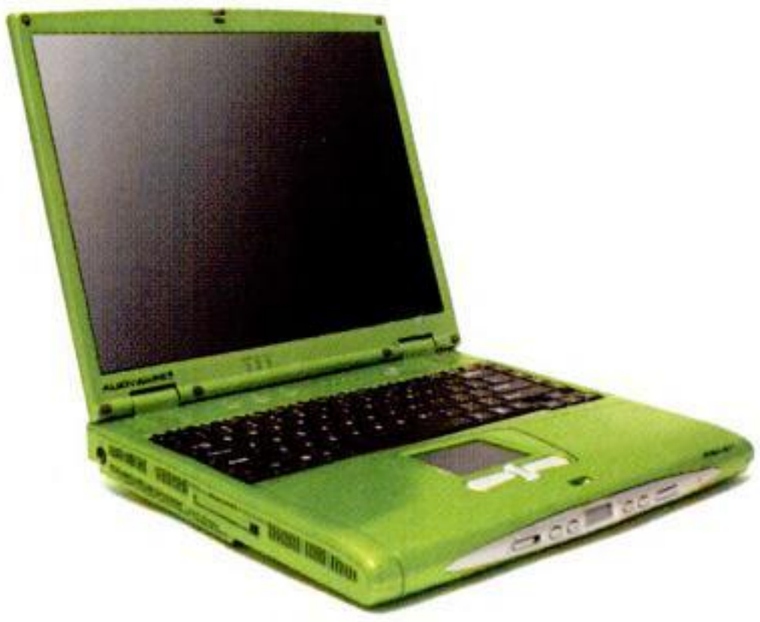

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The Area-51m™ represents the first fully capable mobile gaming solution. The performance requirements of today's most cutting edge games have been simply too demanding for a laptop unit, until now. The Area-51m™ plays games at blistering speeds, handles quick motion with incredible accuracy, and performs phenomenally high in benchmarks. Perfect for LAN parties and for those who simply cannot part from their desktop system's performance, the Area-51m™ is the ultimate mobile gaming machine™.

AREA-51m™ MOBILE GAMING

Intel® Pentium® 4 Processor at 2.8GHz with 533 FSB and 512KB Advanced Transfer Cache
High-Performance Heatsink/Cooling with Arctic Silver III
Intel® 845MP+ ICH3M Chipset Motherboard
512MB PC-2100 DDR SDRAM
Exclusive Metallic Cyborg Green Laptop Chassis
40GB 5400RPM Ultra ATA100 Hard Drive
15.0" UltraXGA+ TFT Active Matrix LCD
ATI® Mobility RADEON™ 9000 PRO 64MB DDR
with Dual-View Display Monitor and TV-out
AlienAdrenaline: Video Performance Optimizer
Removable 3.5" Floppy Drive 1.44MB
Removable 24X/10X/24X CD-RW/8X DVD Combo Drive
Sound Blaster® PRO Compatible with Wavetable
5.1 3D Surround Sound with S/PDIF Digital Output
Front Panel Audio DJ CD Player
Allows CD Play While System is On or Off
One Type II PCMCIA Slot
Four USB 2.0 Ports and One IEEE 1394 Port
Infrared Wireless Fast IR Interface
10/100Mb Ethernet LAN and 56K Modem
Dimensions: (H) x (W) x (D) : 1.7" x 13" x 11.4"
Weight: 7.6lbs. without battery
Exclusive 120-Watt A/C Adapter
Microsoft® Windows® XP Home Edition
1-Year Toll-Free 24/7 Technical Support
with Aliencare On-Site Home Service
AlienAutopsy: Automated Technical Support
Personalized Owner's Manual
FREE Exclusive Alienware® T-Shirt
FREE Custom Alienware® Mouse Pad
Optimized & Configured for High-Performance

$2,999.00

Laptops available in custom metallic colors!

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Alienware® recommends Microsoft® Windows® XP Professional for Mobile Computing.